

**Teachers' entrepreneurial behavior and its impact in school:
Cases studies in Hong Kong**

By

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in Partial Fulfillment of the Requirement for

the Degree of Doctor of Education



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Statement of Originality

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Abstract:

This study explores the impact of teachers' entrepreneurial behavior (TEB) in school in the context of the Hong Kong system. Schools face continuous education reform and a decline in birth rates. In order to survive and thrive in the keenly competitive education market, teachers need to wrestle continuously with a new school-based curriculum. In fact, business corporate employees also deal with new tasks and projects every day. Many empirical studies indicate that developing Employee entrepreneurial behavior (EEB) is an effective way to facilitate employees to deal with the problems currently facing teachers. However, there are only a few empirical studies about TEB in education. As a result, I would like to investigate the impact of TEB. The following research questions guide the study.

1. How do teachers and leaders understand and enact TEB and its components?
2. How do they perceive TEB's impact in schools?
3. What school conditions enhance or challenge TEB?

This study employs a qualitative multiple-site case study to answer the research questions. This research provides insights drawn from teachers' views about TEB in Hong Kong. Enacting TEB is a process by which a teacher demonstrates entrepreneurial competencies and attributes in actualizing an innovation at school. Entrepreneurial teachers have a positive impact on teachers, students, and school branding given conducive school conditions. It contributes to the knowledge base by clarifying and justifying the impact of TEB on school development. This study also promotes the professional development of teachers and principals across the profession with a rubric for assessing the key contribution made by entrepreneurial teachers. Furthermore, this study generates a practical means of defining the term 'innovative teacher' for the policymaker.

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To my sons, “don't give up on your dreams, or your dreams will give up on you”.

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List of Abbreviations

ATE	Chief Executive's Award for Teaching Excellence
COTAP	Committee on Professional Development of Teachers and Principals
DSS	Direct Subsidy Scheme
DSE	Hong Kong Diploma of Secondary Education
EDB	The Education Bureau
EDUHK	The Education University of Hong Kong
EEB	Employee's entrepreneurial behavior
HKSAR	Hong Kong Special Administrative Region
NSS	New Senior Secondary
QEF	Quality Education Fund
STEM	Science, Technology, Engineering and Mathematics
TA	Teaching Assistant
TCF	Teacher Competency Framework
TEB	Teachers' entrepreneurial behavior
TSA	Territory-wide System Assessment
US	United State



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Chapter 1 – Introduction

This study investigates the impact of teachers' entrepreneurial behavior (TEB) on school development. While the discussion of entrepreneurial behavior has been around for many years, connecting it to TEB is a much more recent phenomenon (Borasi et al., 2010). This chapter explains the purpose and significance of the study including research questions. It details the research, design, and organization of the dissertation.

1.1 The Context of the Study

Schools face burgeoning expectations from the government and parents in a quasi-market condition, characteristic of accountability in reforms, and standardization (Deming & Figlio, 2016; Verger, & Steiner-Khamsi & Lubienski, 2017; Woessmann, 2007). This expectation intensifies the need of ongoing school improvement, handling uncertainty, seeking innovative pedagogy, and implementing new school-based curricula (OECD, 2011; Seals et al., 2017). Subsequently, teachers constantly face the challenges of identifying the needs of change, generating new ideas, managing the process of the education reform (Hargreaves et al., 2012).

These challenges are not unique to the education sector that business sector employees also need to be entrepreneurial to adapt to the increasingly uncertain and independent working context (Kuratko, Ireland, Covin, & Hornsby, 2005). Business research shows that the entrepreneurial employee has a strong sense in identifying opportunities in the uncertain environment and making a calculated decision (Barbosa et al., 2007; Boyd et al., 1994; Zhao et al., 2005). They generate innovative ideas for the business to enhance their operational or quality of products/services (Hamel et al. 1994; Grant 1996). In order to accomplish these innovative ideas, they deliberate to lead and monitor the process of implementation (Dess et al., 2005; Bosma et al., 2010). These findings indicate that entrepreneurial behavior can be an effective response to the changing context (Magurie, 2004; Koene, 2006; Zahra, 1991) and constitutes a necessary human capital for organizational growth (Alpkan et al., 2010; Branunerhjelm et al., 2018). Given the increasing recognition of the impact of employee entrepreneurial behavior (EEB) in the changing contexts, studies of entrepreneurial behavior have also been extended to the

educational organizations (Grophs et al., 2015 Lumpkin et al., 1996; Lurtz et al., 2017). Indeed, interest in **teachers' entrepreneurial behavior (TEB)** has grown rapidly in recent years (Chand et al., 2006; Ehrlin et al., 2016; Van Dem et al., 2010; Kurniawan et al., 2017). Eyal et al. (2003) elaborate the relevance of entrepreneurial behavior in a centralized education system, especially among teachers. He advocated the importance of better understanding and measuring entrepreneurial inventory at school context. Other researchers investigated the impacts of TEB, such as enhancing teaching performance (Chand et al., 2006; Hietanen, 2015; Neto et al., 2017), enhancing schools' competitive advantages (Martin et al., 2017), promoting job satisfaction (Hietanen, 2015; Martin et al., 2017; Neto et al., 2017), and even promoting organizational learning (Chand et al., 2006; Hietanen, 2015; Martin et al., 2017).

Despite rising attention paid to studying the school entrepreneurship (Eyal, 2003; 2004; 2012) and our understanding of the impact of TEB has been further expanded, research on the concept and enactment of TEB is still in its beginning stage (Borasi et al., 2010; Hayat et al., 2015; Oplatka, 2014; Rherrad, 2008). The conceptual definition of TEB is limited to the scholars' advocacy that educational entrepreneurship is desirable to solve problems, pioneer change, and promote betterment for the student (Sharra, 2005; Webber & Scott, 2008). Furthermore, most education studies have not a consolidated enactment of TEB (Borasi et al., 2010; Hayat et al., 2015; Neto et al., 2017). Only a few studies have investigated the enactment of TEB (Chand et al., 2006; Ehrlin et al., 2016; Van Dem et al., 2010; Kurniawan et al., 2017).

Conversely, the study of EEB has been well-developed with sufficient literature review in the business sector (Davis et al., 2016; Dess et al., 2005; Jain et al., 2013; Neessen et al., 2018; Sayeed et al., 2003; Weber et al., 2013). Therefore, Neto et al. (2018) and Van Dam et al. (2010) try to use the EEB measurement to study the influence of TEB. As a spearhead of studying TEB from EEB's perspective, they expand the possibility of studying how TEB contribute to the education sector. However, the TEB's study cannot simply ride on the findings of the enactment of EEB's study to explore the impact of TEB, because the nature of their jobs have differed. The conceptual of EEB is not contextualized to the education

sector yet. Future studies should try to use several sources for collecting information to understand the concept of TEB (Van Dam et al., 2010). There is an essential need to clarify the conceptual definition and enactment of TEB in the education section as its studies increase rapidly.

As studying school-based curriculum is the situated context for this study, understanding the reason for developing a school-based curriculum is paramount to recognize the research problems. Teachers actively develop an innovative school-based curriculum for enhancing schools' attractiveness in the keenly competitive education market under uncertain conditions (Onstemk, 2003; Van Dam et al., 2010; Keddle, 2018). The reasons for their active promotion of a new school-based curriculum can be divided into push and pull educational factors.

1.1.1 Push factors

Two principal push factors can be identified in promoting a new school-based curriculum in the current education market. First, the survival of schools is an urgent issue in the education sector. Since 2001 the declining birth rate has caused the closure of some primary schools (Consolidation of High Cost & Under-utilized Primary Schools, 2003). Principals understand that in order to survive their school must attract talented pupils and stand out from their competitors (Foskett, 2002). Second, aligning with education reform is another survival issue in the education sector. Over the last 20 years the Education Bureau (EDB) has continuously introduced education reform (Cheng, 2009), whilst also expecting schools to nurture students' learning and personal growth (Education Bureau, 2018). Teachers are required to handle their routine work while dealing with the reforms. For instance, most teachers spend extra time developing the New Senior Secondary (NSS) curriculum and STEM education with limited resources. If teachers fail to align with the education reforms, it may affect their schools' ability to achieve higher academic performance whilst nurturing well-rounded students. If they cannot stand out from other schools, their school's survival may be threatened.

Principals and teachers see that in order to survive schools must develop high-quality

education. They understand that parents have more choices for their children nowadays. A high-quality education is demonstrated by students' enrolment in high banding secondary schools or the achievement of excellent DSE examination results (Ho & Lu, in press). These are the indicators for parents to choose between schools, which though nominally identical, differ in their league table ranking (Adnett et al., 2000). Many schools, which have attained a sufficiently high educational standard, join the Direct Subsidy Scheme (DSS) to enhance the quality of private school education (EDB, 2016). There is keen competition for schools to attract the most talented students in order that they can thrive. Promoting a new school-based curriculum and providing other new learning experiences are the best ways to ensure the future success and survival of the school.

1.1.2 Pull factors

Conversely, the pull factors of promoting a new school-based curriculum include encouraging talented teachers with the support of the EDB and the Quality Education Fund (QEF). Most teachers' belief in education is the primary incentive for them to improve their school-based curriculum. Nowadays, there are various opportunities for the teacher to acquire new skills in promoting new pedagogy. EDB organizes training workshops and projects which aim to facilitate teachers' implementation of reform. Furthermore, teachers who have an innovative pedagogy, can also apply for the QEF. The QEF is established to fund worthwhile initiatives on a pilot basis and one-off projects that are non-profit-making, aiming to raise and promote high-quality school education. In addition, the Chief Executive Award for teaching excellence organized by EDB with funding support from the QEF recognizes accomplished innovative teachers who demonstrate exemplary teaching practices. These measures serve one purpose - to encourage teachers to be innovative and proactive in developing a new school-based curriculum in schools.

Significantly, both push and pull factors give an impetus for teachers to develop a new school-based curriculum in school. This not only benefits students' learning performance but also secures schools' survival and development. However, there are three practical problems in promoting a new school-based curriculum, which I explain below.

1.2 Research Problems

1.2.1 Contextual problems

Teachers are facing three practical problems in promoting a new school-based curriculum for schools' survival and development. They are: facing uncertain conditions; developing a demanding and innovative pedagogy; and monitoring and implementing a new school-based curriculum to comply with education reform (Hargreaves et al., 2012). For instance, STEM education is a typical example to require teachers to generate an innovative idea for meeting the changes in society and students' needs (Wan et al., 2017). The Curriculum Development Council (2015) encourages STEM education for equipping 'students to meet the changes and challenges in our society and around the world with rapid economic, scientific and technological developments in line with the international trend. Every primary school received \$500,000 to develop a school-based STEM curriculum (EDB, 2016). Schools invested substantial monetary and human resources integrating STEM into the formal curriculum. However, because there is no previous experience to fall back on, teachers have to "wade across the stream by feeling the way," as we say in Chinese. They have no idea how to integrate STEM into their school curriculum without training, therefore it is doubtful that students' learning is enhanced. This is a typical process of education reform for teachers, who are facing uncertain conditions in developing, monitoring, and implementing a new school-based curriculum for STEM.

Theoretically, the practical problems of facing uncertain conditions may be solved by TEB (Lumpkin et al., 1996; Zahra, 1991). In the past decade, studying employees' entrepreneurial behavior (EEB) has become popular in the business sector, and the education sector can learn from this experience (Eyal et al., 2003). Studies indicated that business sector employees also need to illustrate entrepreneurial behavior every day (Musteen et al., 2010). The entrepreneurial employee has a strong sense in identifying opportunities in the uncertain environment and making a calculated decision (Barbosa et al., 2007; Boyd et al., 1994; Zhao et al., 2005). They generate innovative ideas for the business to enhance their operational or quality of products/services (Hamel et al. 1994; Grant 1996). In order to accomplish these innovative ideas, they deliberate to lead and monitor the process of implementation (Dess et al., 2005; Bosma et al., 2010). EEB can



resolve these problems, promote organizational performance (Magurie, 2004; Koene, 2006; Zahra, 1991), and constitutes a necessary human capital for organizational growth (Alpkan et al., 2010; Branunerhjelm et al., 2018). Because the impact of employee entrepreneurial behavior has been recognized, entrepreneurial behavior studies have been conducted on non-educational organizations (Grophs et al., 2015 Lumpkin et al., 1996; Lurtz et al., 2017). Education studies find that some teachers, who wrestle these problems smoothly, perform entrepreneurial behaviors in developing new curriculum (Eyal et al., 2003; Chand et al., 2006; Hietanen, 2015). For instance, they take the initiative to develop new teaching pedagogy and manage the new project on their own, which promote their new school-based curriculum at school smoothly. These are a vivid example of performing entrepreneurial behavior at school.

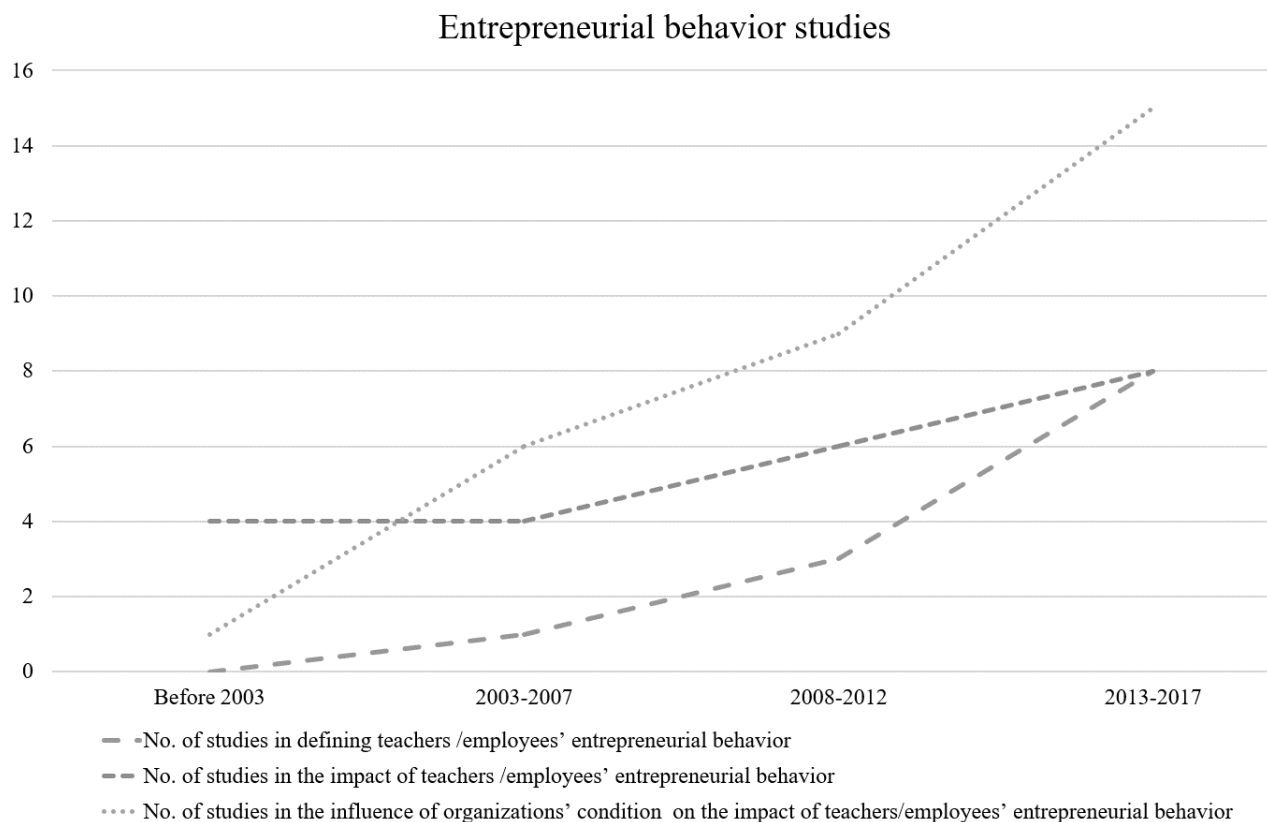
1.2.2 Conceptual problems

To address the conceptual problems, I reviewed TEB and EEB research. The review is divided into three categories: ‘defining TEB and EEB’ (Eyal et al., 2003; Sayeed et al., 2003; Rherrad et al., 2008; Man et al., 2009), ‘impact of TEB and EEB’ (Chand et al., 2006; Hietanen, 2015; Neto et al., 2017), and ‘influence of conditions on TEB and EEB’ (Van Dam et al., 2010; Gustafsson-Pesonen, 2012; Boon, 2013; Kasule et al., 2016). In total, there are 13 studies of defining TEB and EEB, 23 studies of the impact of TEB and EEB, and 33 studies of the influence of condition on TEB and EEB. Table 1.1 and figure 1.1 show that there is a rapid growth in studying TEB and EEB. Although some scholars also tried to study TEB to explain how to solve these problems, I spotted some unclarified problems in studying TEB.

Table 1.1. Number of studies in TEB and EEB

	No. of studies on defining TEB and EEB	No. of studies on the impact of TEB and EEB	No. of studies on the influence of organizations’ condition on the TEB and EEB
1996-2003	Out of research criteria (Explained in section 2.1)	4	1
2003-2007	1	4	7
2008-2012	3	7	9
2013-2018	9	8	16

Figure 1.1. Trend of studies in TEB and EEB



1.2.2.1 Problem one – Incongruence between conceptual definition and operational definition

There is no empirical study or advocacy to define the conceptual meaning of entrepreneurial behavior in the business and education sectors. Compared with the education sector, there are many definitions of entrepreneurship across business disciplines. Generally speaking, entrepreneurship can stand for seizing opportunities to start a new business (Drucker, 1985; Gartner, 1988; Lundström et al., 2010; Yetisen, 2015). When scholars conduct studies of EEB, they define the conceptual meaning of entrepreneurship as being an entrepreneur (Cuervo et al., 2007; Wadhwani, 2010; Tramm & Gramlinger, 2006). Although the common features of describing the definition of entrepreneurship are clarified and affirmed, the conceptual definition of entrepreneurial behavior is unclear. Conversely, with the support of sufficient studies, business scholars realize that the elements of entrepreneurial behavior are diverse, such as innovativeness, risk takings, profit-making, self-efficacy, or self-initiative (Borasi et al., 2010; Rusu et al., 2014). These

studies indicated that no conceptual definition of EEB has been confined, while the operational definition of that is clearly defined.

Accordingly, there is a need to define the conceptual and operational meaning of TEB. Although teachers and business employees have the same responsibility to take risks, to develop, and to manage new tasks; in terms of operational duties, the nature of their jobs differ. While business organizations are profit-oriented, schools are student oriented. Teachers nurture students' personal and educational growth, which means not focusing on examination scores alone. The difference in job objectives means that the conceptual and operational definition of TEB may differ from that of EEB. It is not simply a matter of employing the EEB findings to establish a definition of TEB. However, only a few studies have investigated TEB (Borasi et al., 2010; Hayat et al., 2015). Accordingly, the first research problem statement is:

No conceptual and operational definition of TEB.

Table 1.2. Defining entrepreneurship and entrepreneurial behavior in the business and education sectors

Problem one	Studies from the business sector	Studies from the education sector
Conceptual definition of entrepreneurship	✓	✗
Conceptual definition of entrepreneurial behavior	✗	✗
Operational definition of entrepreneurial behavior	✓	Incomplete

1.2.2.2 Problem two – Lack of research on the impact of TEB

With reference to the business sector's findings, EEB enhances organizational performance and creates a comparative advantage (Wales, 2013; De Clercq et al., 2010). These benefits of EEB may also be applicable in the education sector.

As section 1.2.1 mentioned, the practical problems which teachers face are: uncertain conditions; demanding and developing innovative pedagogy; and monitoring and implementing a new school-based curriculum. Some business empirical studies addressed

these problems. They found that entrepreneurial employees demonstrate risk-taking behavior in uncertain conditions once they identify new opportunities (Yu, 2001; Barakat, 2014; Barbosa et al., 2007; Boyd et al., 1994; Zhao et al., 2005). Entrepreneurial employees demonstrated a creative mindset in constructing a new idea for business operations or projects (Hamel et al. 1994; Grant 1996). They take a crucial role in leading and monitoring the operation of the new task (Katarina, 2015; Gupta, 2014). As a result, the performance of the organization improved.

The research trend of studying the impact of entrepreneurial behaviors move beyond the education and business sector. When business scholars conduct substantial studies of EEB impact, the number of TEB impact was increased gradually in the education sector. The increase in TEB studies may be related to the inspiration of Eyal et al.'s study (2003). Based on the business sector findings, Eyal et al. (2003) explain and elaborate on the relevance of entrepreneurship at school level within a centralized education system. Some education scholars also spotted the importance of studying TEB in addressing the above problems. For instance, Johnson (2004) emphasized that entrepreneurial teachers take the initiative by employing innovative teaching strategies and not merely repeating knowledge. The findings of education studies indicated that TEB has a positive influence in a school context. However, I realized that only seven studies discuss the impact of TEB. Those studies use qualitative research to examine the enactment of and its impact (Chand et al., 2006; Hietanen, 2015; Koene, 2006). Quantitative research on TEB mainly focuses on its impact on one or two dependent variables. They have not discussed the qualitative impact on students' performance or learning attitude (Barakat et al., 2014; Hayat et al., 2011; Martin et al., 2017; Neto et al., 2017). Analysis of TEB from the education sector perspective is limited, especially in Hong Kong. From considering the above factors, the second research problem statement is:

There is a lack of research on the impact of TEB in the education sector internationally and in Hong Kong.

Table 1.3. Studies on the impact of entrepreneurial behavior

Problem two	Solved by the following entrepreneurial behavior	Support by the sufficient business sectors' Studies	Support by the sufficient education sectors' Studies
Facing uncertain conditions	Risk-taking	✓	Incomplete
Demand of developing an innovative pedagogy	Innovation	✓	Incomplete
Monitoring and implementing a new school-based curriculum	The ability to plan and manage a project	✓	Incomplete

1.2.2.3 Problem three – Inadequate studies considering how schools' condition influences the impact of TEB in schools

The number of studies considering how organizations' condition influences the EEB in the business sector is increasing, but there are inadequate studies considering the schools' condition in influencing the impact of TEB in schools. Business scholars have researched the strategies for constructing positive conditions to enhance the impact of EEB in organizations. These empirical studies indicated that several factors within organizations have a positive influence on the impact of EEB. These include: experiential learning (Thomas et al., 2013); observation (Fadde, 2012); reflection (Holcomb, 2009); enhancing interaction (Nancy, 2012); and organizational structure (Walter, 2015). Conversely, the study of constructing a positive school environment to enhance the impact of TEB development is a 'blue ocean'. Some scholars (Lans et al., 2009; Bagheri et al., 2011; Khorrami et al., 2018) have tried to construct a conceptual framework for addressing positive school conditions for TEB. Nonetheless, the conceptual framework is not constructed by an in-depth understanding of the school environment. There are inadequate studies which address the understanding of how school environments influence TEB (Dam et al., 2010; Suzete et al., 2014). Education studies may ride on the rich business findings to construct a framework of analysis, which sheds light the understanding of the conditions of enhancing TEB. Accordingly, the third problem statement is:

There is inadequate research on school-level conditions that influence TEB.

Significantly, the central argument of this research problem is that TEB has a positive impact on enhancing teacher performance, which helps solve the practical problems of facing uncertain conditions while developing, monitoring and implementing a new school-based curriculum. Some conceptual problems, which include definition, enactment, impact, and condition of TEB, are not addressed clearly by previous empirical studies in the education sector. However, the substantial number of empirical studies in the business sector, which discuss conditions influencing EEB, illuminate practical and feasible research niches for studying TEB in the education sector.

1.3 Purposes of the Study

This study proposes to examine TEB in light of the following research problems: no conceptual and operational definition of TEB exists; there is a lack of research on the impact of TEB in the education sector; and there have been inadequate studies of the conditions influencing the impact of TEB in a school context. Accordingly, the purposes of the study can be stated as follows:

1. To define TEB conceptually and operationally by investigating TEB enactment in school.
2. To identify the impact of TEB.
3. To identify conditions in schools that impact on TEB.

1.4 Research Questions

For the purposes of this study, three research questions are as follows:

1. How do teachers and leaders understand and enact TEB and its components?
2. How do they perceive TEB's impact in schools?
3. What school conditions enhance or challenge TEB?

Table 1.4 indicates the links between research problems, research purposes, and research questions. The first research question aims at addressing the conceptual and operational meaning of TEB in school. This question provides the background information for me to

study the second question - 'How do they perceive TEB's impact in schools?' Research question two responds to the study purpose and indicates the significance of studying TEB. The third question of this study offers an opportunity for me to recognize the conditions, which may enhance the impact of TEB in school. Answering these research questions provides a complete picture of the impact of TEB in wrestling with implementing and developing a new school-based curriculum in schools under uncertain conditions.

Table 1.4. Links between research problems, research purposes, and research questions

Research problems	Research purposes	Research questions
No conceptual and operational definition of TEB.	To define TEB conceptually and operationally by investigating TEB enactment in schools.	How do teachers and leaders understand and enact TEB and its components?
There is a lack of research on the impact of TEB in the education sector internationally and in Hong Kong.	To identify the impact of TEB.	How do they perceive TEB's impact in schools?
There is inadequate research on school-level conditions that influence TEB.	To identify conditions in schools that impact on TEB.	What school conditions enhance or challenge TEB?



1.5 Significance of the Study

TEB is a new topic in the Asia-Pacific region and the recognition of TEB is underestimated in education research and in the context of schools. Conversely, many business empirical studies indicate that the effectiveness of EEB is significant for the organization. As a result, developing EEB has become a part of staff professional development to improve organizational competitiveness. TEB may make reference to this trend of developing EEB. Some studies already acknowledge the importance of school entrepreneurship (Eyal, 2003; Eyal et al., 2004; Eyal, 2008; van Dam et al. 2010; Keddie, 2018). These provide the foundation for education scholars to recognize TEB and research its impact on schools. Potentially, TEB has intellectual, practical, and policy significance.

As explained above, there is no accurate and adequate conceptual definition for describing innovative teachers who lead their team to devise and implement a new school-based curriculum. Investigating how entrepreneurial teachers develop a school-based curriculum helps clarify and provide a concrete explanation of TEB. Studying TEB can verify the impact of that behavior in an education framework. Examining how school conditions affect the impact of TEB enhances understanding of the relationship between them. This study can identify the importance of TEB in an education context for future scholars whose research interest is related to teachers' innovation and professionalism (Keddie, 2018).

Practically, this study can help schools to enhance their ability to develop an innovative school-based curriculum. By investigating research questions one and two, this study identifies the features of TEB and illustrates its importance in schools. Furthermore, identifying these features may contribute to strengthening the teacher competencies framework (EDB, 2003). Answering research question three offers a vivid, authentic example of how to enhance the impact of TEB by encouraging positive conditions in schools, and allows principals and teachers the opportunity to reflect on the practice of teacher development. In the long-term, this study's findings further promote the professional development of teachers and principals across the spectrum of the teaching profession.

Furthermore, this study has a policy contribution, specifically the professional standards for teachers of Hong Kong (COTAP – T-standard). The teacher competencies framework provides a general description of teachers' duties at school. However, the description of being an innovative teacher has not been explicitly clarified. This study explores how entrepreneurial teachers exhibit entrepreneurial behavior at school. This helps me to generate a practical indicator for describing the meaning of being an innovative teacher for the policymaker.

1.6 The Research Design

The research conducted a multiple-site case study for the collection of data. The justification for this method is explored in detail in Chapter 3. Briefly, the multiple-site case study provides a discreet system for me to select a relevant sample (Johnson et al., 2011). This facilitates in-depth investigation and understanding of TEB by identifying the similarities and differences among entrepreneurial teachers (Miles et al., 2014). This research design also analyzes school context (Green et al., 2006) for the relationship between school conditions, entrepreneurial teachers, and their behavior. Sampling was based intentionally on awarded teachers who were recognized for developing innovative school-based curricula. Semi-structured interviews, documents, lesson observations, and student work were analyzed.

1.7 Structure of the Thesis

There are seven chapters in this thesis.

Chapter 1 explains the factors in conducting this study, identified three research questions, and explains their significance.

Chapter 2 provides a review of the literature on TEB in order to define TEB; identifies the impacts of TEB, and potential conditions for enhancing entrepreneurial behavior. The review extensively outlines the framework for analysis that is critical in directing this study of TEB.

Chapter 3 describes and justifies a multiple-site case study. It provides an in-depth explanation of how I employ the mixed approach to conceptualize the important themes and concepts that the findings explore.

Chapters 4 to 6 represent the findings of three separate cases. They are: case one (traditional primary school); case two (prestige primary school); and case three (special needs school). These chapters share the same pattern of findings from the three schools. I describe the background information of the entrepreneurial teachers and present the findings in the order of my research questions.

Chapter 7 synthesizes the main findings and the framework for analysis to re-conceptualize TEB in a holistic and critical way. An in-depth discussion of the three research questions contributes to specifying the implications of this study.

1.8 Chapter Summary

The impetus for conducting this study is that developing completely new school-based curricula is an integral part of teachers' careers. This creates the need to establish new teacher competencies, such as a willingness to take risks and the abilities to innovate and plan and manage a project. Within the business sector, research findings probably support the solving of these problems by EEB. However, limited studies have been conducted in the education sector. This limitation endorses research to investigate the impact of TEB in schools. This study directs the attention of theoreticians towards TEB in schools by defining, discovering and investigating the impact and quality of TEB. By using the qualitative multi-site case study to investigate teachers' understanding of innovating and implementing new school-based curricula these study findings respond to the lack of research in the education sector, and propose to fill the research gap and clarify the concept of TEB. Table 7.22 in chapter seven indicates the holistic design of this study. Overall, this study uniquely contributes to teachers' professionalism by identifying a new and important competence in the teachers' professional development framework.

Chapter 2 – Literature review

Chapter Purpose

In this chapter, I review the literature in order to clarify the meaning, enactment, impact, and way of developing TEB. As Hallinger (2013) explained, exploratory reviews are suitable when the research domain is poorly understood, and relevant empirical research remains limited in scope. Given the limited studies, I review business sector research as a reference in order to understand TEB.

This literature review is divided into three sections, which respond to the research questions posed. First, through the lens of business empirical studies into the conceptual and operational definition of EEB, I clarify the meaning of TEB in the context of education. The second section illustrates the potential for enactment and impact of TEB. This provides a basis upon which to construct a conceptual framework for analyzing the data. The third section examines how the schools' conditions influence TEB. Table 2.1 indicates the links between the research questions and the literature review.

Table 2.1. Links between the research questions and the literature review

Research questions	Literature review
1. How do teachers and leaders understand and enact TEB and its components?	Section 2.1: Clarify the meaning of TEB in the education context through the lens of business empirical studies into the conceptual and operational definition of EEB
2. How do they perceive TEB's impact in schools?	Section 2.2: Illustrates the potential for the enactment and impact of TEB
3. What school conditions enhance or challenge TEB?	Section 2.3: Examines how the schools' conditions influence TEB

2.1 Conceptual and Operational Definition of TEB

The purpose of section 2.1 is to clarify the conceptual and operational definition of TEB through the lens of business empirical studies into the conceptual and operational definition of EEB. Because the limited number of empirical studies in the education sector (Keddie, 2018), mainly discuss the school entrepreneurship (Eyal, 2003; 2004), I need to review empirical studies and literature from the business articles as a reference. I begin by proposing a conceptual definition of TEB in 2.1.1. Based on this conceptual definition, I

set clear criteria for reviewing empirical studies and review articles in defining the operational definition of TEB in 2.1.2.

2.1.1 Determine the conceptual definition of TEB

2.1.1.1 Method of determining the conceptual definition of TEB

Since the 1920s, the study of entrepreneurship has become a favorite topic. The meaning of entrepreneurship has evolved over time. However, only eight articles, which discuss the definition of entrepreneurship in the business sector, have been found in google scholars. Therefore, I quote these definitions from peer-reviewed articles and compare various scholars' advocacy for analyzing the trend of defining entrepreneurship. This practice provides an opportunity for me to discover the possible conceptual definition of TEB.

2.1.1.2 Understanding of entrepreneurship

Entrepreneurship has a long history and is the subject of many studies in the business sector. Traditionally, there are well-established definitions for this specific term, such as:

“The process of extracting profits from new, unique and valuable combinations of resources in an uncertain and ambiguous environment.” (Drucker, 1985)

“Entrepreneurship can be defined as the process by which new ventures are created.” (Gartner, 1988; Yetisen, 2015)

“Entrepreneurship is first and foremost a mindset. To seize an entrepreneurial opportunity, one needs to have a taste for independence and self-realization.” (Lundström et al., 2010)

The above definitions, which are commonly used in business articles and textbooks, are presented in different ways. However, the common features of entrepreneurship are about seizing opportunities to start a new venture (business). They have not mentioned anything about entrepreneurial behavior.

2.1.1.3 New interpretation of entrepreneurship

The definition of entrepreneurship can be divided into the business level and personal level, which relate to the conceptual definition of EEB as well. Some scholars (Miller, 1983; Hornaday, 1992; Gardner, 1990) state the need for characterizing entrepreneurial behavior,

as a new perspective for defining entrepreneurship. Although no universal definition of entrepreneurship has been articulated (McKenzie et al., 2007; Shane, 2000), generally agree that entrepreneurship is applicable for an employee who serves in an organization and exhibits various entrepreneurial behaviors (Dees 1998; Shane 2012; Sharma and Chrisman 2007).

“Entrepreneurship is an organizational process to encourage and practice innovation, risk-taking and a proactive approach towards competition and opportunities.” (Fox, 2005)

“It is more than just a leader who performs in an established organization; he/she faces different challenges and leads to an extraordinarily complex situation.” (Cogliser & Brigham, 2004)

“Entrepreneurship is also covering entrepreneurial behavior of staff, as self-reliant behavior with regard to one’s own employability, as well as individual autonomy.” (Tramm & Gramlinger, 2006)

On the other hand, some scholars designed another term to describe staff members, who perform entrepreneurial behavior in the organization. Since 1976, they name it as intrapreneurship (Amo et al., 2005).

“Managers and employees could be inspired to behave entrepreneurially; create innovations, and obtain profit and growth.” (Block et al., 1993; Bowman, 1999; Brazeal, 1993)

“Intrapreneurship is a unique combination of entrepreneurial behavior and creativity within an organizational.” (Antoncic et al., 2001)

With the support of sufficient studies, the European Commission (2006) also emphasizes the importance of fostering individual entrepreneurial mindsets as a major policy initiative. They issue a guideline, which align with other scholars’ advocacy for EEB, to describe the attributes of being an entrepreneurial employee. These EEBs are creativity, innovation, risk-taking, and self-confidence. They expand the conceptual meaning of entrepreneurship from the entrepreneur level to employee level as well.

The definition of employees’ entrepreneurship conceptualizes the definition of EEB. The meaning of entrepreneurship widens from entrepreneurs’ behavior to include employees’ behavior. Although there are two different terms for describing an employee -

intrapreneurship and EEB, the above definition and the advocacy of European Commission indicated consent, and a new trend, that entrepreneurship can be applied to an employee. This definition may be the conceptual definition of EEB.

2.1.1.4 Defining conceptual meaning of EEB for TEB study

By reviewing the definition of entrepreneurship we can see that the broader definition of entrepreneurship is obviously describing the EEB at the conceptual level. This conceptual definition of EEB goes beyond its economic meaning and is infusing the values of the corporate sector, albeit in the form of ‘personal development’ (As Cited from Pantea, 2016; Smyth 1999; Sukarieh & Tannock 2009). The application of EEB even expands to the education sector as TEB (Brandsford et al., 2005; Neto et al., 2019; van Dam et al., 2010). Entrepreneurship in education is about teachers’ behaving as entrepreneurs, rather than starting a business. In general, TEB can simply be described as a subset of an EEB. Therefore, theoretically, this study can explore and clarify the definition of TEB through the lens of understanding the definition of EEB.

As Smith et al. (2002) assert that EEB is a comprehensive term for capturing all action taken by employees in the organization. Some scholars advocate that the failure of studies to polish the conceptual definition of entrepreneurship indicates the need for contextualizing the definition. In other words, I need to have a ‘dimension’ to make up a single concept (Blackstone, 2012).

In exploring the conceptual definition of EEB, Antonic et al. (2003) conducted a systematic review of defining entrepreneurship and intrapreneurship with 23 empirical studies. These empirical studies showed that entrepreneurship has a broader meaning. It can be establishing a business, or the personality of an entrepreneur/employee in an organization. As a result, they define intrapreneurship as entrepreneurship within an existing organization, referring to emergent behavioral intentions and behavior within an organization. Although these scholars name it as intrapreneurship Antonic et al. (2003) provide evidence to support the existence of EEB and the possibility of defining the conceptual meaning of EEB. The dimension of conceptualizing entrepreneurial behavior

extends to the employee level.

Unfortunately, polishing the definition of EEB, which is a process of understanding the reification, is both critical and difficult. For instance, Kobia et al. (2010) conducted a review for defining the meaning of entrepreneurship. After reviewing 98 articles, they tried to conceptualize entrepreneurship in three categories - traits, behavior, and opportunities. However, they asserted that there is no common definition of entrepreneurial behavior in literature. Gondogdu (2012) also reviewed 44 articles and scholarly books about entrepreneurship, intrapreneurship, and innovation; finally combining them into one specific term, innopreneur. Innopreneur means a person who can seize opportunities by performing innovative and persistence attitudes. Gondogdu's advocacy is a good intention. However, Kobia and Gondogdu have not constructed a systematic review method with any empirical evidence to support their advocacy in defining entrepreneurship.

The above advocacies and research indicate uncertainty in conceptually defining EEB. To deal with this problem, Landström and Benner (2010) claimed that the definition of entrepreneurial behavior should be addressed by the researcher rather than holding a rich set of "right" problematizations. For example, Burns (2008) defined the conceptual definition of EEB by reviewing various articles. He analyses that the actions which define entrepreneurialism are not dictated by the organization the individual happens to work in.

Based on Benner's suggestion and some scholars' practice, I assert that the measures for a conceptual definition of TEB are proactiveness (Eyal, 2003) and innovativeness (Antoncic et al., 2001; Bowman, 1999; Brazeal, 1993; Block et al., 1993; Eyal, 2003). These two dimensions are commonly emphasized in business and education research. I also propose that creating new teaching and learning strategies represent the measure of innovativeness in the education context. For the reification, most EEB research emphasizes the process of personal development (Pantea, 2016; Smyth 1999; Sukarieh & Tannock 2009). By considering the dimension and reification findings from the EEB research, I propose a temporary conceptual definition of TEB as follows:

TEB is a process of personal development in which a teacher actively demonstrates entrepreneurial behavior by creating new teaching and learning strategies in school.

The reason for developing a temporary conceptual definition of TEB is that it helps me to clarify the reification and define the dimensions of TEB. By conducting a study in school to explore the conceptual definition of TEB, I can discern how TEB is enacted in the school context and consider it using the conceptual definition as a reference.

2.1.2 Define the operational definition of TEB

2.1.2.1 Criteria for selecting literature

Section 2.1.2 defines the conceptual meaning of TEB in schools, but the operational definition of TEB is not yet confirmed. Compared with the study of TEB, some business research already defines the operational definition of EEB (Davis et al., 2016; Dess et al., 2005; Jain et al., 2013; Sayeed et al., 2003; Weber et al., 2013). Their findings are valuable to aid me in discovering an entrepreneurial teacher in my study. In order to understand TEB, there are some criteria for reviewing empirical studies and review articles.

This review has two criteria for selecting literature. They are the relevance of the topic, and the timeliness of studies. First, empirical studies that define entrepreneurial behavior in the education and business sector are basic criteria for enhancing relevance. Second, all empirical studies and review articles, excepting the education literature, should be dated within the last 17 years and include a peer review. The primary reason for this restriction is a lot of research defining entrepreneurial behavior has been conducted since Eyal et al. (2003) summarized previous qualitative studies on principal's entrepreneurial behavior. The time restriction offers a clear boundary for selecting the up-to-date definition of entrepreneurial behavior, while some review articles provide a systematic summary of previous empirical researches. Based on the above criteria, 14 items of literature have been selected for defining the operational meaning of TEB. They are presented in **appendix one**.

2.1.2.2 Research trend of defining operational definition of TEB

The major difference between defining an operational definition of entrepreneurial behavior in the education and business sectors is the research method in studying TEB.

For the education sector, research on defining the operational definition of teacher entrepreneurial behavior is in the startup stages. I searched through over 17 years' worth of studies but only found seven empirical studies. Furthermore, these studies have limitations in defining TEB. For instance, Borasi et al. (2010) analyzed only six schoolteachers, while Rherrad et al. (2008) focused on one TEB. Although Hayat et al. (2015) conducted systematic studies on defining TEB, they only collected data from the students. Conversely, Van Dam et al. (2010) have sufficient samples but focused on the teachers' original competencies by using business research measurement. No in-depth analysis or contextual instruments have been applied for TEB studies.

In contrast, increasing amounts of the business sector quantitative research and review articles show insight in defining the operational definition of EEB. First, all empirical studies were conducted on a quantitative basis. As Johnson et al. (2011) explained, qualitative research discovers a new element by considering contextual factors, while quantitative research consolidates and confirms these findings. These studies aimed at confirming and identifying EEB in different business scenarios. Second, high-quality review articles show a full picture of the study trend in defining EEB. There was no review article defining EEB until Dess et al. (2005), since then two more review articles have been conducted. Most importantly, the review method of these two review articles becomes more systematic. Jain et al. (2013) reviewed nearly all empirical research in defining EEB, while Rusu et al. (2014) formed clear criteria and used a systematic analysis method in reviewing these studies. Third, the operational definition of EEB has been already contextualized to the Hong Kong business context by Man et al. (2005; 2009). Based on a theoretical framework, built on international findings, of entrepreneurial competencies, Man et al. (2005) conduct a study to investigate the EEB of SME managers in the Hong Kong services sector. They further the understanding and contextualized EEB to the Hong Kong context into ten categories in 2009. These EEBs are the opportunity, relationship, analytical, innovative, operational, human, strategic, commitment, learning, and personal

strength. Their studies indicate that there is a need to contextualize EEB to the local context and that is possible. Compare with the business studies, the operational definition of TEB is not yet contextualized to the education context, even Hong Kong.



2.1.2.3 Empirical studies and review articles' findings

Table 2.2 presents the different scholars' key attributes of entrepreneurial behavior.

Table 2.2. List of empirical studies and review articles findings

Way of defining entrepreneurial behavior	Name	Attributes of entrepreneurial behavior
Deductive approach*	Borasi et al.	Driven by a vision, Relentlessly engaging in innovations, Being alert to and ready to seize opportunities, Not constrained by resources, Masters at networking, Making quick and timely decisions, Creative problem-solving, Confident risk-taking, Importance of being or finding a champion for each innovation, Capitalizing on crisis and dysfunction
	Sayeed et al.	Adventurer, Innovator, Designer, Leader, Entrepreneur, Change Agent, Animateur
	Davis et al.	Confidence, Optimism, Persistence
Mixed (inductive and deductive) approach**	Jain et al.	Opportunity recognition sensitivity, Marketing orientation, Achievement orientation, Innovativeness, Risk-taking
	Dess et al.	Autonomy, Innovativeness, Pro-activeness, Competitive aggressiveness, Risk-taking
	Man et al.	Opportunity, relationship, Analytical, Innovative, Operational, Human, Strategic, Commitment, Learning, Personal strength
	Weber et al.	Innovativeness, Autonomous, Risk-taking, Managing
	Rgerrad et al.	Innovative and productive in knowledge generation
	Rekha et al.	Risk-taking, Learning from experience, Positive attitude, Innovative
	Rusu et al.	Profit making, Innovation, Creation of new organization, Personal satisfaction, Risk-taking (Carrier of uncertainties)
	Van Dam et al.	Entrepreneurial knowledge, career adaptability, occupational self-efficacy, creative thinking, networking skill, education
	Bosma et al.	Own initiative, Overcoming internal resistance, Risk-taking, Develop new product and service
	Hayat et al.	Innovativeness, Pro-activeness, Risk-taking
	Oplatka	Innovative, Take initiative
	Neto et al.	Risk-taking with self-efficiency
	Eyal et al.	Innovativeness, Principals' pro-activeness

**Deductive approach: Scholars define the operational definition of entrepreneurial behavior by analyzing the data of employees' personality and performance.*

***Mixed approach: Scholar defines some entrepreneurial behavior in the operational term by reviewing previous empirical studies (inductive approach), which they treated as a reference for them to test the reliability and validity of their studies. After they conducted an interview, they analyzed the data by reviewing these terms (deductive approach).*

Based on the above table, I critique the way of defining teachers' EEB in section 2.1.2.4 and 2.1.2.5. This critique served to summarize scholars' operational definition of TEB methodically.

2.1.2.4 Limitations of using a deductive approach in defining operational definition of entrepreneurial behavior

There are some limitations in using a deductive approach to define the operational definition of TEB in research. In general, scholars have not conducted a systematic literature review on defining TEB and EEB. For example, Borasi et al. (2010) use a grounded theory approach. Sayeed et al. (2003) and Davis et al. (2016) use a general term of personality instead of a specific attitude or behavior. This approach generates the following problems.

First, the deductive approach creates duplicated attributes in entrepreneurial behavior. Borasi et al. (2010) conducted six case study of defining entrepreneurial behavior from entrepreneurial teachers. However, they have not reviewed previous business entrepreneurial behavior studies to construct a basic framework for analyzing entrepreneurial behavior. As a result, they defined eleven entrepreneurial behaviors from six samples. Some entrepreneurial behaviors have similarities, such as relentlessly engaging in innovations and the importance of being or finding a champion for each innovation.

Second, this approach also has the limitation of generality in identifying the entrepreneurial employee. Davis et al. (2016) interviewed 1872 employee in the business sector. Although they concluded that confidence, optimism, and persistence are key attributes of being an

entrepreneurial employee, these attributes are too general to enable me to identify an entrepreneurial employee. For instance, Sayeed et al. (2013) interviewed 101 middle managers from the business sector. They categorise their finding of entrepreneurial behavior into the general description as Adventurer, Innovator, Designer, Leader, Entrepreneur, and Change Agent. When they test the Cronbach's alpha, the result is insignificant. They stated that these descriptors are too general to define entrepreneurial behavior.

2.1.2.5 Trend of using the mixed approach in defining the operational definition of entrepreneurial behavior

Most review articles and empirical studies tend to adopt a mixed approach in defining the operational definition of entrepreneurial behavior. In empirical studies, Dess et al. (2005) compressed entrepreneurial behavior into five operational categories by reviewing three entrepreneurial behavior model studies. They are autonomy, innovativeness, pro-activeness, competitive aggressiveness and risk-taking. This approach has become popular for scholars using the operational approach to categorize TEB and EEB. For example, Bosam et al. (2010) tried to identify and compare the different entrepreneurial behavior among 10,000 employees from 100 countries. This massive study defined EEB into four operational attributes: own initiative; overcoming internal resistance; risk-taking; and developing new products and services. Rekha et al. (2014) also categorized EEB into four operational attributes by studying 367 SMEs' entrepreneurial employees' behavior.

In reviewed articles, scholars also intend to construct a systematic categorizing method for defining EEB in an operational approach. In the past 30 years, Jain et al. (2013) have reviewed 229 qualitative and quantitative empirical studies, identifying entrepreneurial behaviors and their impact. They concluded that there are five entrepreneurial behaviors. Rusu et al. (2014) had a similar result by reviewing 23 empirical studies measuring EEB by studying performance. Although the type of entrepreneurial behavior is not the same as Jain et al. found, it indicated that using the mixed approach to define the operational meaning of EEB is the trend.

Scholars who adopt the mixed approach in categorizing EEB find a significant effect using the quantitative research method. The significant result of quantitative research indicates that using a mixed approach is the most reliable way to reflect and measure TEB. One typical example is Man et al.'s studies (2009) that define and contextualize the operational definition of EEB to the Hong Kong business context by using the mixed approach. They construct a theoretical framework with international articles and conduct a qualitative study to define EEB. Then, they conduct a quantitative study to refine the operational definition of EEB. Their successful experience provides a shred of persuasive evidence for this study to employ the mixed approach in defining TEB for the Hong Kong education context.

To sum up, the mixed approach of defining the operational meaning of TEB is suitable for this study, because some successful experience in the education sector can be found by employing a mixed approach. For example, Rgerrad et al. (2008) conducted a study identifying the contribution of entrepreneurial behavior in university. Because of the nature of the job they defined entrepreneurial behavior as innovative behavior only. They measured the contribution of entrepreneurial research staff to the university. Over 1400 university research employees responded to their questionnaire. Their study revealed that it is paramount for the study to categorize and screen some entrepreneurial behavior at an operational level, especially in the education sector. Otherwise, it is irrelevant for research to locate entrepreneurial teachers. Oplatka (2014) also adopted the same approach in defining TEB by interviewing ten principals and 30 teachers. This approach offered a chance for him to identify outstanding entrepreneurial teachers' behavior in developing a new curriculum. Their successful experiences guide the methodology of this study to define TEB in chapter three.

2.1.2.6 Defining TEB

In light of recent moves toward theorizing TEB and EEB, it is as an innovative teacher and employee that I synthesize the literature findings in table 2.3. The operational definition of TEB can be defined as innovation, risk-taking, the ability to plan and manage a project, autonomy with a positive attitude, and seeking external resources.

Table 2.3 Synthesis of TEB

Entrepreneurial behavior	Synthesis by the literature	Author	Example of entrepreneurial behavior
Innovation	Innovativeness, Innovator, Innovative, Innovations, Creative thinking	Eyal et al. (2003), Sayeed et al. (2003), Rherrad et al. (2008), Man et al. (2009), Borasi et al. (2010), Bosma et al. (2010), Van Dam et al. (2010), Jain et al. (2013), Weber et al. (2013), Oplatka (2014), Rekha et al. (2014), Hayat et al. (2015)	<ul style="list-style-type: none"> - Examining the problem in teaching - Generating new ideas in teaching and learning
Risk-taking	Seize opportunities, Opportunity recognition, Risk-taking with self-efficiency/confidence, Confidence	Man et al. (2009), Borasi et al. (2010), Bosma et al. (2010), Van Dam et al. (2010), Jain et al. (2013), Jain et al. (2013), Weber et al. (2013), Rekha et al. (2014), Hayat et al. (2015), Davis et al. (2016), Neto et al. (2018)	<ul style="list-style-type: none"> - Identifying potential threats as opportunities - Analysing opportunities and how to address them - Taking action
The ability to plan and manage a project	Leader, Change Agent, Vision, Networking, Making decisions, Creative problem-solving, Career adaptability	Sayeed et al. (2003), Man et al. (2009), Borasi et al. (2010), Van Dam et al. (2010), Weber et al. (2013)	<ul style="list-style-type: none"> - Engaging in problem solving activities - Working with teachers as a leader/coordinator - Practicing effective communication skills
Autonomy with positive attitude	Principals' pro-activeness, Autonomy, Take initiative, Overcome internal resistance, Marketing orientation, Positive attitude, Persistence, Optimism	Eyal et al. (2003), Dess et al. (2005), Bosma et al. (2010), Jain et al. (2013), Weber et al. (2013), Oplatka (2014), Rekha et al. (2014), Hayat et al. (2015), Davis et al. (2016)	<ul style="list-style-type: none"> - Taking initiative to learn and adapt into teaching - Practicing optimistic thinking even facing adversity
Seeking external resources	Not constrained by resources, profit-making, external resources support	Man et al. (2009), Borasi et al. (2010), Sayeed et al. (2003), Jain et al. (2013), Van Dam et al. (2010)	<ul style="list-style-type: none"> - Expanding network for gathering resources



Innovation

The most obvious and concrete form of TEB is innovation. Innovation refers to the act of dealing with a problem or difficulty by turning new and imaginative ideas into reality (Boyett et al., 1993). In the literature, the innovation depends upon teachers' capacity and readiness to address the difficulties in teaching and learning. Most entrepreneurial teachers initially identify the difficulties and problems in employing routine teaching and learning strategies. They then gather information and generate a new idea (Wiklund et al., 2003; Mumford, 2011) for designing a new teaching and learning pedagogy to solve the problems (Hayat et al., 2015; Oplatka, 2014). Their pedagogical innovation often becomes the root of a new school-based curriculum, which enhances teaching performance and the working environment among school teachers (Rherrad et al., 2008; Jain et al., 2013).

Risk-taking

Risk-taking is the driver for promoting innovation in the organization (Gibb et al., 2010). In general, risk-taking should be defined as an orientation to try or explore something new even though a positive outcome is not guaranteed. Therefore, most teachers have a negative perception of risk-taking as a threat and danger in uncertainty (Erikosn, 2001). Literature of TEB and entrepreneurial behavior amalgamate and clarify the misunderstanding of the above meaning of risk-taking. Literature indicates that teachers' risk-taking orientation plays a pivotal role in explaining the influence of their innovative behavior. Generally speaking, entrepreneurial teachers, who calculated the potential loss and balanced the risk and return, valued the calculated risk as an opportunity. They tended to take the risk as a way of enhancing the performance of the original pedagogy (Dess et al., 2005; Weber et al., 2013). Teachers are motivated to exhibit risk-taking behavior because they understand the importance of seizing opportunities to improve teaching standards. (Hayat et al., 2015; Neto et al., 2018).

The ability to plan and manage a project

Studies describe the skills of this TEB as leading, decision making, problem-solving, managing, networking, etc. These are the managerial skills utilized when leading a team and we, therefore, identify this TEB as the ability to plan and manage a project. The

entrepreneurial teacher utilizes this crucial behavior to accomplish their innovative idea. It describes the process of performing the managerial skill in organizing resources towards influencing the achievement of their work objective (Khaled et al., 2014). Entrepreneurial teachers need to work with other teachers to transform innovative pedagogy into practice by implementing a variety of strategies (Weber et al., 2013; Lumpkin et al., 1996). They set the plans and programs of work that aim to achieve the goals of innovative pedagogy (Borasi et al., 2010; Bosma et al., 2010). Although there are various obstacles to actualizing the initial plan, entrepreneurial teachers operate in positions of control and significant influence within the formal structure of the school which ensures the quality of outcome (Davis et al., 2016; Rherrad et al., 2008; Sayeed et al., 2003; Van Dam et al., 2010; Weber et al., 2013).

Autonomy with positive attitude

Autonomy with positive attitude refers to teachers' belief that they are capable of a proactive manner in pursuing the work objective (Davis et al., 2016; Hayat et al., 2015; Rekha et al., 2014). Entrepreneurial teachers have the courage to voice and perform their idea of change as the initiator for demanding change at school (Bosma et al., 2010; Eyal et al., 2003). During the process of transforming the original pedagogy into their innovative pedagogy, they face other teachers' resistance. The entrepreneurial teacher would consider the positive impact of their innovative idea and be eager to accomplish their assignment (Borasi et al., 2010; Bosma et al., 2010; Dess et al., 2005; Rekha et al., 2014). Autonomy with positive attitude is the motive for the entrepreneurial teacher to thrive, regarding teaching and leading a team, rather than simply surviving in their work (Hayat et al., 2015; Oplatka, 2014).

Seeking external resources

No study specifies seeking external resources as one of the TEBs. However, entrepreneurial teachers are not restricted by limited resources at school (Borasi et al., 2010; Van Dam et al., 2010). They have the intention to seek outside resources to support their innovative pedagogy. This practice is similar to the entrepreneurial behavior in the business sector. The employee would gather external resources from different sources to accomplish their

task of improving profits (Sayeed et al., 2003; Jain et al., 2013).

Irrelevant items - Others

Some items, such as competitive aggressiveness, cannot be found in systematic empirical studies and reviewed articles. These items were located in Dess et al. (2005) studies only. In order to maintain the trustworthiness of the study, I do not consider these items.

2.1.3 Conclusion for section 2.1 literature review

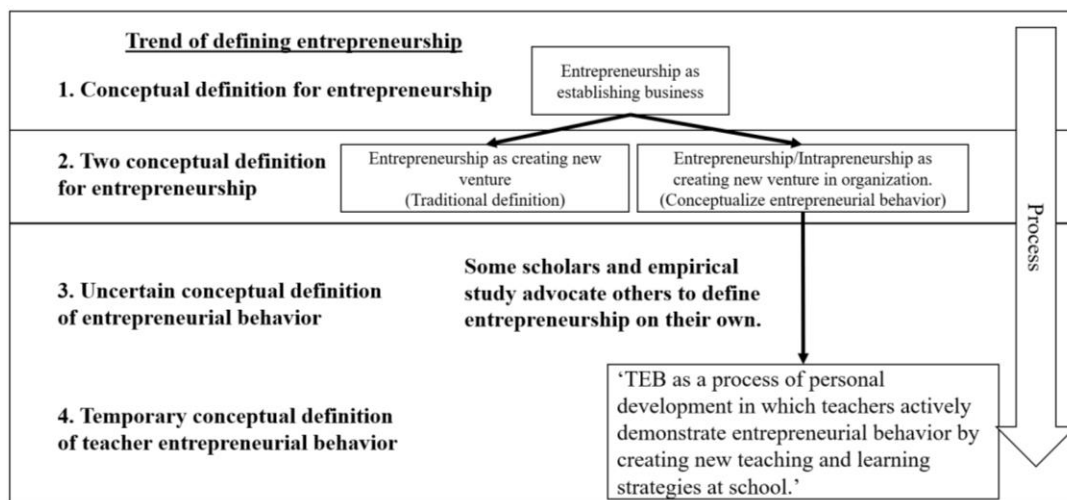
2.1.3.1 Defining conceptual and operational definition of TEB

From reviewing the various definitions of entrepreneurship, I can identify two major types. They are: establishing a new business as an entrepreneur; and creating a new venture in the organization as an employee. The conceptual definition of entrepreneurship has evolved, transformed and expanded to include entrepreneurial behavior at the employee level.

Although there is no standard conceptual definition of TEB, I have compiled a temporary one by reviewing various scholars' advocacy and considering the education context as follows:

'TEB as a process of personal development in which teachers actively demonstrate entrepreneurial behavior by creating new teaching and learning strategies at school.'

Figure 2.1. Process of defining conceptual definition of teachers' entrepreneurship for this study



Based on this conceptual definition, I review empirical studies and review articles in order to understand how scholars define the operational definition of TEB and EEB. By considering the timeliness and trustworthiness of these findings, I describe five major categories for identifying teachers who have entrepreneurial behavior. These entrepreneurial behaviors are: innovation; risk-taking; the ability to plan and manage a project; autonomy with a positive attitude; and seeking external resources. To simplify the definition of TEB, I summarize it in the following sentences:

TEB refers to teachers who perform innovation, risk-taking, plan and manage projects, show autonomy with a positive attitude, and seek external resources.

Defining the operational definition of TEB is crucial for this study because these behaviors allow me to locate and analyze the entrepreneurial teachers as a study sample. The previous figure indicated the process of defining the operational definition of TEB in this part.

2.1.3.2 Contribution to research niches and methodology

To conclude, section 2.1 literature review responds to the research question one from the conceptual aspect to the operational aspect. This review provides a suggested definition for the education sector by reviewing the development of defining entrepreneurship in the business sector and considering it in the context of education. For defining the operational definition of TEB, I reviewed review articles and the strategies of empirical studies in defining EEB. I conducted an inductive approach to defining TEB at this stage. There is an insufficient understanding of the definition of TEB, it is valuable for me to explore this research niche in this study.

For the contribution to research methodology, an in-depth understanding of defining TEB is required for this study. I can use this literature review as a reference and investigate the conceptual and operational definition of TEB from the research field to fulfill the research niches. These two answers are a crucial concept for me to conduct a study in answering research question one. The contribution of 2.1 literature review is presented in table 2.4.

Table 2.4. Contribution of 2.1 literature review to research questions, niches and methodology

Research questions	Literature review	Research niches and methodology
1. How do teachers and leaders understand and enact TEB and its components?	<p>Section 2.1: Clarify the meaning of TEB in the education context through the lens of business empirical studies' findings in the conceptual and operational definition of EEB</p> <p>Answers:</p> <ol style="list-style-type: none"> <i>TEB as a process of personal development in which teachers demonstrate entrepreneurial behavior by creating new teaching and learning strategies at school.</i> <i>TEB refers to teachers who perform innovation, risk-taking, plan and manage a project, show autonomy with a positive attitude, and seek external resources.</i> 	<p>Research niches: There is an insufficient understanding of the definition of TEB, it is valuable for me to explore this research niche in this study.</p> <p>Research methodology: In-depth investigation is required for modifying the operational definition of TEB.</p>



2.2 Impact of TEB

Overview of Section 2.2

The purpose of section 2.2 is to understand the empirical studies' findings on the impact of TEB. I set criteria for selecting literature. Based on these criteria, I analyze reports and research findings in section 2.2.2. In section 2.2.3, I relate the research niches of these studies and the contribution in designing the research methodology.

2.2.1 Criteria for selecting literature

The principle of selecting literature is the relevancy of the impact of TEB. Accordingly, I identify the empirical studies and review articles, which are presented in **appendix two**. One point, which is pivotal, is that there is a gap from the year 2000 to 2004. I found that these studies mainly discussed the impact of entrepreneurs' entrepreneurial behavior at corporate level instead of employee level. Therefore, I decided to remove this literature from the review section.

2.2.2 Empirical studies' findings of the impact of entrepreneurial behavior

I categorize empirical studies and review articles findings in table 2.5. Five impacts of TEB from the education and business sector are identified and presented in the table. I also try to distinguish the common and unique impacts on the business and education sector, which may provide an insight for designing the research methodology.

Table 2.5. Categorizing the impact of entrepreneurial behavior from empirical studies and review articles

	Education studies'		Business studies'	
	findings	Author	findings	Author
Impact of TEB	General performance (Teaching)	Chand et al., 2006; Hietanen, 2015; Neto et al., 2017	General performance (Profit-making)	Covin et al., 1991; Covin et al., 1999; Wiklund, 1999; Wiklund et al., 2005; Lim et al., 2008; Rauch et al., 2009; Engelen et al., 2012; Wales, 2013
	Creating competitive advantage (New curriculum)	Martin et al., 2017	Creating competitive advantage (New venture)	Kuratko et al., 2005; De Clercq et al., 2010; Jain et al., 2013;
	Risk-taking with higher job satisfaction	Hietanen, 2015; Martin et al., 2017; Neto et al., 2017	Risk-taking with higher job satisfaction	Rae et al., 2013; Pearce et al., 1997
	Promote organizational learning	Martin et al., 2017	Promote organizational learning	Molina et al., 2009; Vishal et al., 2014
	Expand network for resources	Koene, 2006; Chand et al., 2006		



2.2.2.1 Common impacts - Enhancing general performance

TEB has a positive impact on general performance. Empirical business studies mainly measure the profitability of the organization to indicate the impact of EEB, while no clear performance standard has been set for the education sector. Nearly all empirical studies indicated that EEB enhances overall company performance (Covin et al., 1991; Covin et al., 1999; Wiklund, 1999; Wiklund et al., 2005; Lim et al., 2008; Rauch et al., 2009; Engelen et al., 2012; Wales, 2013) by measuring the profitability of the company concerned. Katarina (2015) explained the reason for this enhancement of general performance as being because entrepreneurial employees did not limit their role as an employee only to their current organizational contexts, but they also saw themselves as facilitating the organization to become an entrepreneurial organization. This autonomous attitude enhances organizational performance.

A similar impact has also been found in the education sector in terms of students' performance. However, it has not been stated how these performances were measured. Hietanen (2015) and Chand et al. (2006) found that TEBs enhance teachers' performance and facilitate students' learning at school. Neto et al. study (2017) provides a precise reason for the enhancement of teaching performance. They discovered that entrepreneurial teachers aim to improve their teaching strategies. They ultimately gain successful experience in promoting new pedagogy, which in turn promotes continuous improvement in teaching and learning. They reinforce the positive performance at school.

2.2.2.2 Common impacts - Creating competitive advantage

Some business studies found that innovative entrepreneurial behavior creates a competitive advantage for the organization. De Clercq et al. study (2010) researched 232 marketing development companies. These companies emphasize the importance of innovation. Hence, they adopt innovation as a factor for driving the impact of EEB. They found that innovative behavior creates new ways for the company to compete with others. Kuratko et al. (2005) and Jain et al. (2013) conducted a literature review on the impact of EEB. They summarise these impacts into these categories:

Diversification into new product-market arenas. Enhancement of innovation capability. Strategic drifting away from the core business, venture growth, and being the first mover in competition.

Although the above studies showed a variety of impacts, these impacts have one common feature. This feature is ‘creating competitive advantage’ through innovation. This impact enhances organizations’ performance and sharpens their competitive edge over others.

The impact of innovation is also applicable to the education sector. Martin et al. (2017) conducted a study about science TEB in STEM education. They discovered that entrepreneurial teachers intend to create a unique curriculum for their students because they do not want to do the same things others did. Their entrepreneurial behavior has a significant influence in dealing with the competitive environment of schools (Frey, 2010; Yang, 2008; Swiercz and Lydon, 2002). It enhances a schools’ ability to recognize opportunities and equip it to pursue new ventures effectively.

2.2.2.3 Common impacts – Risk-taking with higher job satisfaction

TEB can enhance teachers’ job satisfaction and cultivate confidence in confronting risk. There is a positive relationship between EEB and job satisfaction (Pearce et al., 1997). As Stewart (1989) emphasized, the acceptance of the new challenge is greater when high job satisfaction is found. Rae et al. (2013) tried to test this argument by studying 50 entrepreneurial employees. They found that entrepreneurial employees place a positive value on facing incidents and are willing to take immediate action, resulting in high job satisfaction.

Coincidentally, Martin et al. (2017) also test the impact of TEB in confronting risk and found a positive correlation. These teachers are strongly confident in facing risk because innovating a new curriculum gives them high job satisfaction. These studies indicated that job satisfaction and risk-taking are interactive factors in TEB (Neto et al., 2017).

2.2.2.4 Common impacts – Promote organizational learning

TEB also has a positive impact on promoting organizational learning. Molina et al. (2009) claim that entrepreneurial employees encourage colleagues to acquire new competencies for getting their job done. This advocacy is supported by Vishal et al. (2014). They studied 500 enterprises in which entrepreneurial employees promoted organizational learning. Vihaya et al. (2006) and Cope (2000) explained that entrepreneurial employees automatically recognize their development needs and engage in acquiring new competencies for managing the innovative strategies. Their self-directed learning attitude is the primary reason for promoting organizational learning.

There is also an excellent example in the education sector from Martin et al. (2017). They studied 74 entrepreneurial teachers in the U.S. These entrepreneurial teachers automatically acquired new competencies in managing their innovative teaching and learning strategies. In addition, they influenced their colleagues to acquire these new competencies. As a result, entrepreneurial teachers promote the learning of new competencies in the organization (Hamel, 1994; Grant 1996) through performing innovation.

2.2.2.5 Unique impact in the education sector – Expanding network for resources

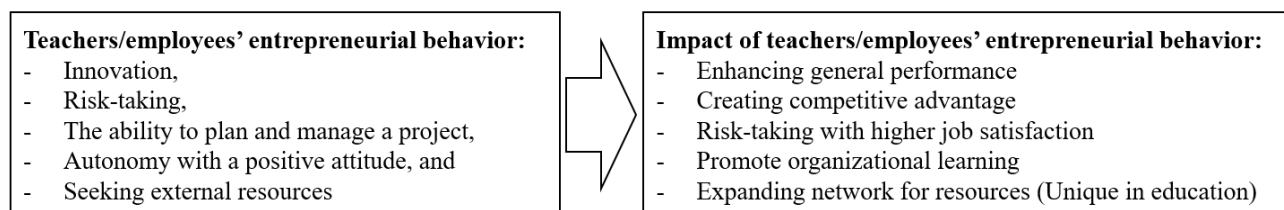
TEB may generate more resources for the school. Koene et al. (2006) and Chand et al. (2006) interviewed 22 and 120 teachers, respectively, in developing a school-based curriculum or activities. Their studies showed that entrepreneurial teachers expand their network informally with outsiders or teachers from other schools. This network connection helps them to gain support from outsiders with such things as money or attaining new knowledge. They finally integrated these resources into implementing their curriculum or activities successfully. This dependent variable has been found to be unique to the education sector.

2.2.3 Conclusion for section 2.2 literature review

2.2.3.1 Contribution to research question - Identifying the impact of TEB

Part two of the literature review presented five impacts of TEB, which may be associated with schools' conditions, including constructing a communication network, market orientation, and leadership style. I found that these impacts of TEB may interact with each other. In order to present the impacts clearly, I compiled figure 2.2 to illustrate their relationship and indicated the unique variable from the education sector.

Figure 2.2. Impact of TEB



2.2.3.2 Contribution to research niches and methodology

Section 2.2 literature review indicated two paramount research niches for this study. A unique impact has been found which offers proof that there is some difference between the business and education sector. I summarize the findings and inspiration in table 2.6.

Firstly, empirical studies' findings in the business sector cannot directly explain the impact of TEB in schools because of the different context of schools and their organization. Referring to the literature review, the impact of the general performance of TEB in the education sector is reflected in students' performance while that of the business sector is seen in profit making. Furthermore, a unique impact, expanding the network for resources, has been found in the education sector. These findings indicate that the different context of schools and corporate businesses lead to differing impacts on the organization.

Second, the qualitative research method may be appropriate for understanding the schools' context in the education sector. In general, all research is conducted on a quantitative research basis, especially in the business sector. They measure profit-making as the overall performance of the organization. This is a reasonable and persuasive measurement because these organizations are profit-making. However, the number of studies on the impact of

TEB is insufficient both in understanding and investigating the impact of TEB in the context of schools. The trustworthiness of, and confidence in, quantitative research are lower without sufficient support from qualitative research findings, especially as no study has been conducted in Hong Kong before. I surmise that the quantitative research method may not be the appropriate research method for assessing the impact of TEB at the early stages in the academic arena.

Guided by the business sectors' empirical studies and review articles, I identify many similar impacts of EEB in boosting organizational performance. This literature review not only responds to the research question but also provides some insight for me to construct the research niches and methodology.



Table 2.6 Contribution of section 2.2 literature review to research questions, niches and methodology

Research questions	Literature review	Research niches and methodology
2. How do they perceive TEB's impact in schools?	<p>Section 2.2: Illustrates the potential of enactment and the impact of TEB</p> <p>Answer:</p> <p>1. <i>There are five impacts of TEB while expanding a network for resources is a unique impact in the education sector.</i></p>	<p>Research niches:</p> <p>Variety meaning of impacts under the business and education context:</p> <p>1. Diverse context between the business and education sectors</p> <p>Research methodology:</p> <p>The qualitative method may promote high relevancy in research, because of the nature of the organization.</p>



2.3 Schools' condition enhance the impact of TEB

Overview of Section 2.3

Section 2.3 literature review aims to explore the influence of schools' conditions on the impact of TEB. Given that the impact of TEB is to enhance schools' performance, the number of studies into how school conditions influence the impact of TEB increases sharply. I state the criteria for selecting literature in section 2.3.1 and compare the differences in the influence of organizations' conditions on TEB studies in section 2.3.2. I also discuss the contribution of section 2.3 literature review in section 2.3.3.

2.3.1 Criteria for selecting literature

This study has two concerns in setting the literature selection criteria. First, I use the exploratory approach in selecting literature. Although there are many theoretical models in professional development, only one model is about constructing a positive condition for enhancing the impact of EEB. In 2009, Lan et al. advocated that there is a need to construct a theoretical framework for how to construct a condition for facilitating the impact of EEB and they suggested observation, learning through doing, and reflection to be the basis of the theoretical framework. Bagheri et al. (2011) adopted their approach. They reviewed 68 articles and tried to conceptualize a theoretical model for developing EEB. However, their theoretical model has not been tested since 2011. Because of the lower trustworthiness of their approach, I decided to stick to the exploratory approach in the literature review.

Secondly, instead of focusing on principals' entrepreneurial behavior, I focus on the conditions influencing the impact of TEB in the organization. This criteria enhances the validity of the literature review. In general, there are two types of literature in entrepreneurship studies. First, some studies focus on studying what factors influence an entrepreneur's behavior in establishing a new company. This is not the focus of this research. Second, scholars discussed and focused on the conditions influencing the impact of TEB. These studies match the focus of this research because they investigated employee entrepreneurship. In addressing the above concern, I decided to search for three major keywords in the research literature. They are 'learning', 'developing', and 'conditions'. I found that many business studies tend to use 'learning' to describe how organizational

conditions influence EEB while ‘developing’ is the common language for describing how school conditions influence the impact of TEB in the education sector. The above measure enhances the trustworthiness and relevancy of selecting literature (Creswell, 2013).

In considering these criteria, this literature review examined 36 articles published over a 20-year timescale from 1996 to 2017. I make a judgment on the nature of studies in **appendix three**.

2.3.2 Empirical studies’ findings of how schools’ conditions influence the impact of TEB

The aim of this section is constructing a temporary conceptual framework for studying how school conditions enhance the impact of TEB and EEB. I compiled table 2.7 to summarise empirical studies and review article findings. This table indicates six major conditions affecting TEB. I explain these findings one-by-one and discover the potential contribution to this analysis.

Table 2.7. Categorizing the schools/organizations' condition for enhancing TEB and EEB from empirical studies and review articles

Education conditions	Authors	Businesses' conditions	Authors
Formal entrepreneurial behavior course	Dam et al., 2010; Gustafsson-Pesonen, 2012; Boon, 2013; Kasule et al., 2016	Formal entrepreneurial behavior course	Lans et al., 2004; Bagheri et al., 2011; Nicoleta, 2014; Adekiya et al., 2016;
Learning through doing	Gustafsson-Pesonen, 2012; Boon, 2013	Learning through doing	Lans et al., 2004; Bagheri et al., 2011; Jain et al., 2013; Nyello et al., 2015
Self-reflection	Katariina, 2015	Self-reflection	Gondim et al., 2011; Davis et al., 2015; Baggen et al., 2016; Kor, 2016
Organizational culture	Hassan, 2012; Boon, 2013; Kurniawan et al., 2017, Dam et al., 2010; Khorrami et al., 2018	Organizational culture	Petrekis, 2005; Ribeiro-Soriano et al., 2010; Szczepańska-Woszczyna, 2015; Baggen et al., 2016
Leadership	Eyal et al., 2004; Hassan, 2012; Suzete et al., 2014	Leadership	Christensen, 2005; Rutherford et al., 2007; Soriano et al., 2007; Engelen et al., 2012; Mukherji et al., 2012; Moriano et al., 2014; Szczepańska-Woszczyna, 2015; Afsar et al., 2017
Communication network	Koene, 2006; Chand et al., 2006; Eyal, 2008; Dam et al., 2010; Gustafsson-Pesonen, 2012; Boon, 2013; Katariina, 2015; Kasule et al., 2016; Khorrami et al., 2018	Communication network	Lans et al., 2004; Christensen, 2005; Brunaker et al., 2006; Lim et al., 2008; De Clercq et al., 2010; Mckeown, 2010; Ribeiro-Soriano et al., 2010; Bagheri et al., 2011; Yaghoubi et al., 2011; Wales, 2013; Baggen et al., 2016
		Rewarding	Brazeal, 1996; Christensen, 2005; Rutherford et al., 2007
		Market orientation	Jain et al., 2013

2.3.2.1 Common condition – Principal's leadership

The principal plays a highly positive role in enabling entrepreneurial behavior (Eyal et al., 2004; Hassan, 2012; Suzete et al., 2014; Christensen, 2005; Rutherford et al., 2007; Engelen et al., 2012; Moriano et al., 2014; Afsar et al., 2017). Since Eyal et al. (2004) explored the relationship between a principal's transformational leadership and their school's entrepreneurial inventory, including pro-activity and innovation, other education scholars have begun studying how a principal's leadership influences TEB. Studies show that a principal contributes to a higher tolerance of making a mistake (Hassan, 2012), offers resources support, and gives a unity of direction (Christensen, 2005; Rutherford et al., 2007) in enabling TEB. Although these education studies only describe the principal's practice of nurturing TEB, they indicate that a principal's leadership is the accelerator for promoting TEB (Todnem, 2005; Suzete et al., 2014).

Conversely, business studies contribute to conceptualizing how leadership facilitates TEB. Studies reveal transformational leadership as the crucial factor in facilitating individuals' entrepreneurial behavior, especially serving as a system for individuals' professional development (Jung et al., 2003; Afsar et al., 2017; Moriano et al., 2014; Szczepańska-Woszczyńska, 2015). A transformational leader clarifies the direction and coordinates the professional development for the individual. They serve as a mentor and nurture individual entrepreneurial behavior, as part of the process of professional development. They also provide emotional support to trigger individuals' desire to commit innovative activities (Breugst et al., 2012), which may enhance their job satisfaction and lead to the trial of more new ideas (Soriano et al., 2007).

The concept of how transformational leaders mobilise individuals to perform the entrepreneurial behavior in the business studies may also be applicable in the education framework. Current trends in educational leadership and administration highlight the importance of principals' transformational leadership in shaping teachers' personality and motivating teachers through caring for and inspiring their individual needs (Hallinger, 2010; McCarley et al., 2016; Price et al., 2015). Adopting this angle, we explore how the principal's leadership generates school conditions which shape and enable TEB, in order

to better understand the impact of transformational leadership on TEB.

2.3.2.2 Common condition - Formal entrepreneurial behavior course

Firstly, a formal entrepreneurial behavior course, provided by the principal, enriches teacher understanding of the enactment of entrepreneurial behavior and strengthens the impact of TEB in school. A formal entrepreneurial behavior course fosters TEB in secondary school because offering entrepreneurial courses enhances teachers' cognitive understanding (Lo, 2018) for entrepreneurial decision-making (Van Dam et al., 2010; Gustafsson-Pesonen, 2012; Boon, 2013) and stimulates teachers' innovative entrepreneurial behavior (Kasule et al., 2016).

A similar result was also found in the business sector (Lans et al., 2004; Bagheri et al., 2011; Adekiya et al., 2016). Nicoleta (2014) conducted a study for an entrepreneurial behavior course, which lasted for three months. Nearly all participants agreed that the entrepreneurial behavior course enhanced cognitive understanding of entrepreneurial behavior. Studies also indicated that diverse learning opportunities could cater to individual needs in entrepreneurial behavior. Offering various entrepreneurial courses, which cater to individual needs, could facilitate innovative entrepreneurial behavior in teaching staff (Kasule et al., 2016).

However, the critique of the entrepreneurial behavior course claims that it comes to an unsatisfactory end without engagement (Jarvenoja et al., 2013). Every individual has unique needs in developing entrepreneurial behavior, and an entrepreneurial behavior course may not be applicable to their daily routine (Skipton et al., 2014). The irrelevant content finally discourages teachers to grasp the cognitive knowledge of entrepreneurial behavior, and they become reluctant to attend the entrepreneurial behavior course (Kasule et al., 2016). The mixed results of the effectiveness of an entrepreneurial behavior course indicate the importance of practical learning which fits into a teaching context.

2.3.2.3 Common condition - Learning through doing

Learning through doing provides an opportunity for teachers to utilise the knowledge they

have acquired in the entrepreneurial course. Learning through doing is a paramount condition for enhancing entrepreneurial behavior because entrepreneurial behaviors are action-oriented and much of their learning is experientially based (Rae et al., 2000). Although there is no example of learning through doing in TEB, Gustafsson-Pesonen's study (2012) and Boon's study (2013) are examples of learning through doing in the teaching and learning sector. They investigated an entrepreneurial behavior course through which participants had an opportunity to perform their task. Researchers found that learning through doing provides a chance for teachers to apply what they have learned. These empirical studies revealed that learning through doing can nurture TEB.

Much business research supports the finding that employees can enhance their entrepreneurial behavior by learning through doing (Lans et al., 2004; Bagheri et al., 2011; Jain et al., 2013; Nyello et al., 2015). For instance, Nyello et al. (2015) studied 233 social workers in structured entrepreneurial workplace training and found that this learning through doing activity facilitated entrepreneurial behavior in their organization (Ronald, 2009; Anderson et al., 2008; Matthew et al., 2007). The more experience they acquired, the higher their effectiveness in performing the entrepreneurial behavior (Robert, 2008; Clarke, 2006).

It is prudent to remember that there are some factors to take into account when developing learning through doing. Roger (1969) stated that significant and meaningful learning through doing could change a person's mindset permanently which is not necessarily always positive. Furthermore, learning through doing should have an appropriate context, because performance can be transformative in an unexpected working environment (Deakins and Freel, 1998). Therefore, the design of behavioral learning should be challenging but attainable and realistic to ensure that teachers can gain experience and enhance entrepreneurial behavior (Bjork and Linn, 2006; Metcalfe, 2011; Pittaway and Cope, 2007).

2.3.2.4 Common condition – Flexible and openness school culture

It can be suggested that constructing a flexible and supportive school culture is the key to

facilitating TEB at school (Hassan, 2012; Kurniawan et al., 2017; Van Dam et al., 2010). Traditionally, hierarchical organization culture with a top-down management approach, discourages individuals from acquiring and performing entrepreneurial behavior. When promoting TEB, the principal has a responsibility to clear the hierarchical cultural barriers and create a powerful and equitable learning atmosphere for teachers at school (Boon, 2013; Kurniawan et al., 2017). Boon's studies (2013) demonstrate an excellent example of clearing the hierarchical culture barrier in the education sector. In his case study, principals and teachers stated that the organizational culture is a crucial factor influencing their willingness to perform entrepreneurial behavior at school. This flexible and supportive school culture boosts teachers' willingness to perform TEB and convinces the operationally minded teacher to follow the changes under the principal and entrepreneurial teachers' guidance (Ouchi, 2003; Geijsel et al., 2003).

Business research also reflects that a hierarchical organization culture has a negative impact on EEB. Petrekis (2005) conducted a literature review on employees' professional development finding that a hierarchical organization culture discourages employees to acquire new competencies. Therefore, Ribeiro-Soriano et al. (2010) claim that clearing the hierarchical cultural barriers will promote an equitable organization culture for enhancing entrepreneurial behavior.

2.3.2.5 Common condition - Communication network

Communication networks inside and outside schools enhance the effectiveness of TEB (Boon, 2013; Dam et al., 2010). Through social interactions, teachers can learn and further their knowledge inside the organization. They can also share experiences through social processes. Katariina (2015) interviewed 23 teachers and found that teachers can acquire entrepreneurial behavior competencies with the assistance of other teachers inside the school network. Eyal (2008) did not limit the network to people but also included the financial network. His study on the financial network also has an inspiring finding for the study of TEB. He found that radical entrepreneurship is related solely to the school's access to the internal financial network. Some business research provides a deeper understanding of communication networks inside the organization. There are different forms of the

communication network for example: constructing a communication platform; creating an information team; and cross-team working (Brunaker et al.; 2006). These communication networks could be informal or formal (Christensen, 2005). With the support of a systematic communication platform, employees exchange their information to enhance the impact of EEB inside the company (Lim et al., 2008; Wales et al., 2013).

On the other hand, the outsider network facilitates TEB. Some teachers gain successful and innovative ideas from teachers in other schools (Van Dam et al., 2010; Kasule et al., 2016). These studies indicate that the network outside of the school brings respective knowledge, skills (Donaldson, 2001); experience to entrepreneurial teachers (Boud and Costley, 2007; Ribeiro-Soriano et al., 2010); and generates more innovative ideas by gaining coordination experience from other schools (Kasule et al., 2016). Business research indicated that professional industry staff is more willing to seek external parties' assistance and thus generate more innovative ideas (Ignatius et al., 2008; Ribeiro-Soriano et al., 2010). They also gain knowledge, skills (Donaldson, 2001) and experience (Boud and Costley, 2007) from the outsider.

2.3.2.6 Common condition - Self-reflection

The self-reflection process helps teachers conceptualize and understand what they have learned in the entrepreneurial behavior course and from learning through doing. Katariina (2015) studied the entrepreneurial training for teachers. Teachers were required to write a reflection diary during the entrepreneurial training which she found enhanced teachers' understanding of entrepreneurial behavior with teammates' support. This diary catered for their emotional needs and encouraged them to perform TEB.

It is a consistent finding in the business research that self-reflection is an essential element of internalizing EEB. Learning through doing is not enough for developing EEB, the professional development process must include self-reflection (Kor, 2016). Self-reflection enhances employees' efficiency because employees found that the reflection process internalizes the EEB of handling uncertainty (Davis et al., 2015; Baggen et al., 2016). The successful experience of handling uncertainty generates a positive emotion in performing

EEB (Gondim et al., 2011). Therefore, the better they are at handling uncertainty, the more positive EEB perform (Sosba, 2009).

2.3.2.7 Unique condition in the business sector - Rewarding

Education literature seldom discusses the impact of the rewards system on TEB, because of the ‘single-salary’ schedule and rigid promotion system (Dee et al., 2015). Conversely, the prevalence of business studies’ finding raise the consideration of how leaders construct a rewards system to encourage entrepreneurial behavior. Generally speaking, rewards, which promote individual entrepreneurial behavior, imply job security, monetary reward, and even an emotional reward for recognizing effort or achievement (Christensen, 2005; Rutherford, 2007). A leader can balance the reward measures to reinforce individual incentives for performing the entrepreneurial behavior. However, studies also found that the scheduled salaries system, if beyond a minimum threshold, has no impact on promoting EEB (Brazeal, 1996; Bassett-Jones et al., 2005; Strunk et al., 2015). These studies imply that principals should serve as the mediator in adjusting the rewards system.

2.3.2.8 Unique condition in the business sector – Market orientation

Market orientation is a condition for enhancing the impact of EEB in organizational performance. There are 11 articles discussing the importance of market orientation in Jain et al. review articles (2013). They emphasized that organization success is most likely when market orientation is directly associated with EEB, such as risk-taking, pro-activeness, innovation, etc. This advocacy indicated that the innovative strategies, which are promoted by the entrepreneurial employee, should connect to the market orientation. In practice, the trend of education reform is similar to the market orientation. Every school needs to follow the trend of education reform for fulfilling EDB requirements and parental expectations. Market orientation may be the condition for TEB.

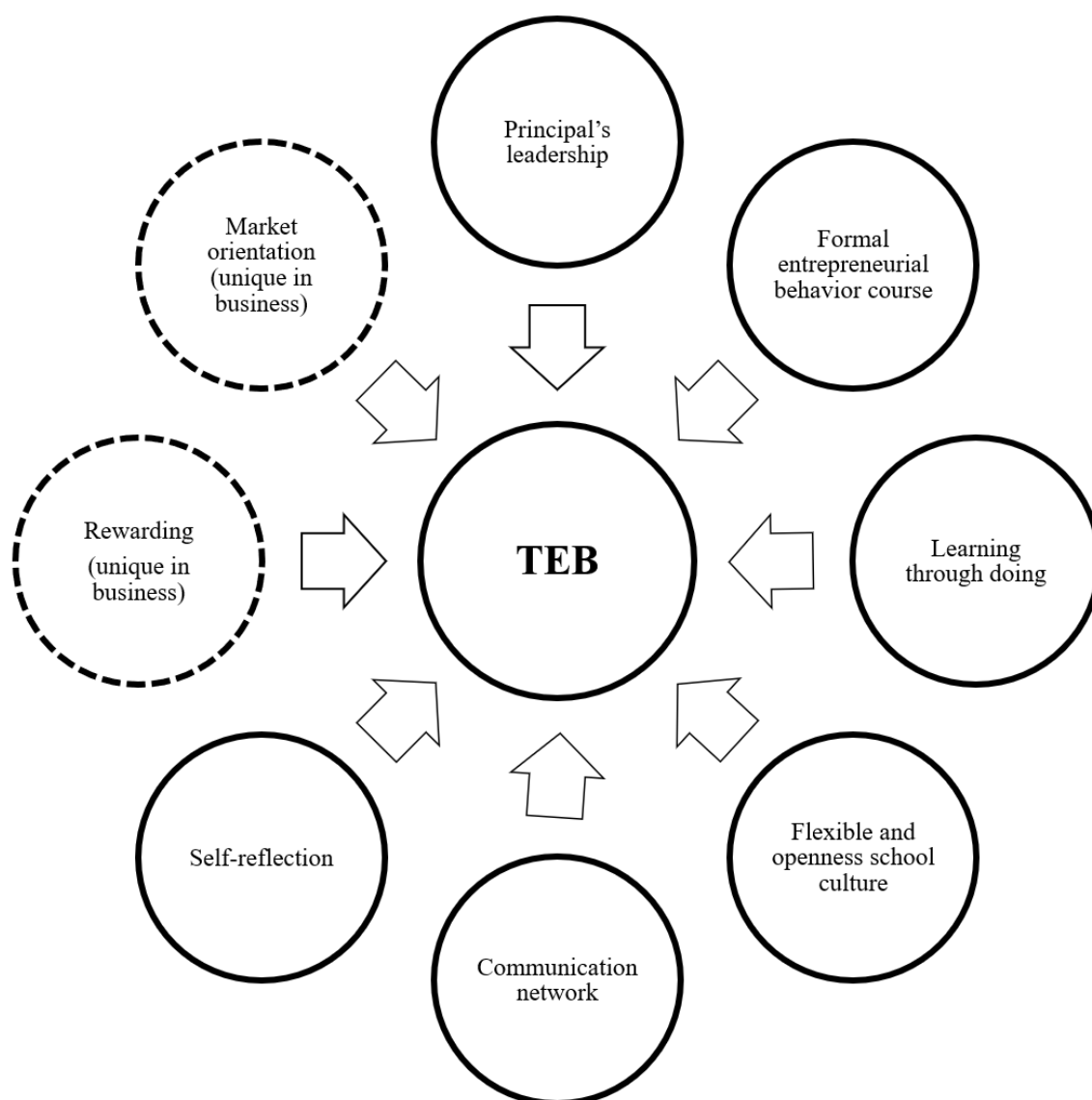
2.3.4 Conclusion for section 2.3 literature review

2.3.3.1 Contribution to research question – Identifying the conditions for enhancing TEB

Section 2.3 literature review summarises the empirical findings of the influence of schools’

conditions on TEB. In reality, these conditions are not likely to be a linear relationship. I have compiled figure 2.3 to present their interactive relationship.

Figure 2.3. The influence of schools' conditions on TEB



2.3.3.2 Contribution to research niches and methodology

Section 2.3 literature review contributes significant findings to me in identifying research niches and concerns in research methodology.

With regard to the research niches, this section indicates an insufficient understanding of

how schools' conditions interact with TEB, alongside a lack of in-depth understanding of various conditions, such as the impact of specific leadership styles, rewards systems, and market orientation. There are various leadership styles at school, which may have a variety of influence over enhancing TEB. This important issue has not been discussed before. Rewards and market orientation have never been discussed in facilitating TEB. For the aforementioned reasons, these conditions are the research niches for this study.

With regard to the research methodology, insufficient understanding of the topic implies the need for an in-depth appreciation of the various conditions and an investigation of the interactive relationship between them. Although education scholars prefer to study the interaction among multiple conditions, they have conducted a sophisticated discussion on how conditions facilitate TEB only. Conversely, business scholars devoted to studying the impact of specific conditions, have sufficient empirical studies to support their in-depth analysis of specific conditions through quantitative researches. Compared with the business sector; there is a need to clarify various conditions with an in-depth investigation of the education sector. For example, scholars have not clarified what kinds of learning through doing activities; communication networks; or ways of promoting reflection enhance TEB. Therefore, this study needs to understand how teachers respond to various conditions in order to understand the interactive relationship among schools' conditions.

Table 2.8 Contribution of section 2.3 literature review to research questions, niches and methodology

Research questions	Literature review	Research niches and methodology
3. What school conditions enhance or challenge TEB?	<p>Section 2.3: Examines how the schools' conditions influence TEB</p> <p>Answer:</p> <p><i>There are five school conditions affecting the impacts of TEB while rewarding and market orientation are unique conditions in the business sector.</i></p>	<p>Research niches:</p> <p>Insufficient understanding on how conditions interact with TEB:</p> <ol style="list-style-type: none"> 1. Lack of in-depth understanding of various conditions (e.g. Leadership style) 2. Need to understand the interactive relationship between schools' conditions and TEB <p>Research methodology:</p> <ol style="list-style-type: none"> 3 Most education studies were conducted on a qualitative basis. 4 There is a need for clarifying various conditions in the education sector, such as learning through doing activities, communication networks, or ways of promoting reflection.



2.4 Conclusion for Chapter 2

2.4.1 Framework for analysis

I outline the findings from section 2.1 to 2.3 in figure 2.4, which respond to three research questions. TEB as a process of personal development in which teachers demonstrate entrepreneurial behavior in creating new teaching and learning strategies at school. TEB refers to teachers who perform innovation, take risks, plan and manage a project, show autonomy with a positive attitude, and seek external resources. There are five impacts which TEB shares with EEB while expanding networks for resources is a unique impact in the education sector. There are five school conditions affecting the impacts of TEB while rewarding and market orientation are unique conditions in the business sector.

2.4.2 Insight for research niches

Referring to section 2.1, 2.2 and 2.3, there is an insufficient understanding of the definition, impact, and condition of enhancing TEB in the education sector, as shown in table 2.9. It highlights the potential for insight and research niches in the education sector, which I undertake to explore during this study. In chapter three, I will state the research methodology for answering the research questions by considering the literature review findings.

Figure 2.4. Framework for analysis

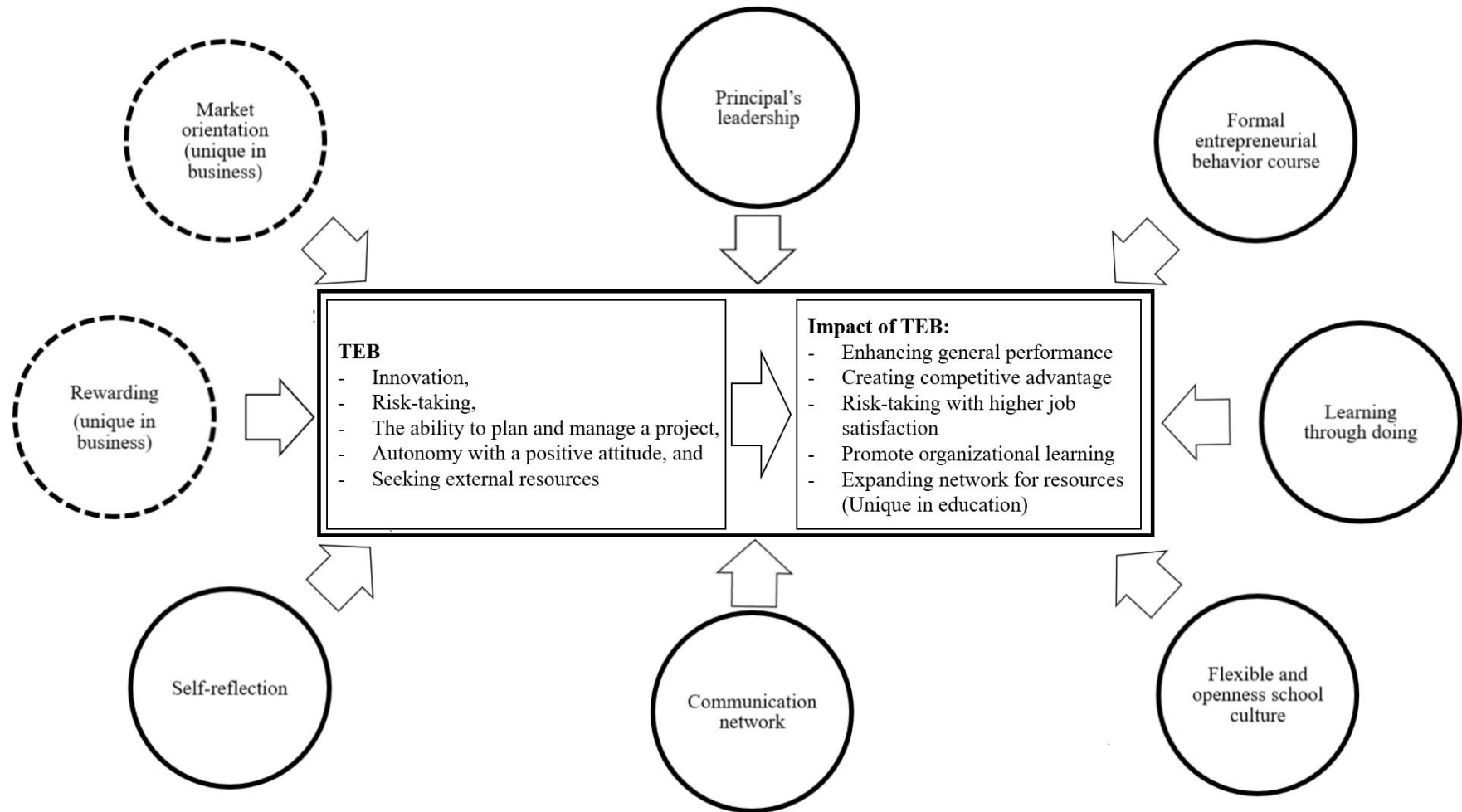


Table 2.9 Summaries of chapter two and connect to research niches and methodology

Research questions	Literature review	Research niches and methodology
1. How do teachers and leaders understand and enact TEB and its components?	<ol style="list-style-type: none"> TEB as a process of personal development in which teachers demonstrate entrepreneurial behavior in creating new teaching and learning strategies at school. TEB refers to teachers who perform innovation, risk-taking, plan and manage a project, show autonomy with a positive attitude, and seek external resources. 	<p>Research niches: There is an insufficient understanding of the definition of TEB, which is valuable for me to explore in this study.</p> <p>Research methodology: In-depth investigation is required for modifying the operational definition of TEB.</p>
2. How do they perceive TEB's impact in schools?	There are five impacts of TEB while expanding network for resources is a unique impact in the education sector.	<p>Research niches: Variety of meaning of impacts in the business and education contexts:</p> <ol style="list-style-type: none"> Diverse contexts between the business and education sector <p>Research methodology: The qualitative method may promote high relevancy in research, because of the nature of organization.</p>
3. What school conditions enhance or challenge TEB?	There are six school conditions affecting the impacts of TEB while rewards and market orientation are unique conditions in the business sector.	<p>Research niches: Insufficient understanding of how conditions interact with TEB:</p> <ol style="list-style-type: none"> Lack of in-depth understanding of various conditions (e.g. Leadership style) Need to understand the interactive relationship between schools' conditions and TEB <p>Research methodology:</p> <ol style="list-style-type: none"> Most education studies were conducted on a qualitative basis. There is a need for clarifying various conditions in the education sector, such as learning through doing activities, communication networks, or ways of promoting reflection.



Chapter 3 – Research Methodology: Multiple-site Case Study

Purpose of this Chapter

The purpose of this chapter is to explain and describe the methodology used for this research. The previous chapters have discussed the background of the study and provided a literature review that indicates relevant issues of TEB as well as providing a framework for the examination of data collection and analysis. In this chapter, I describe the rationales for choosing a qualitative research method and explain how this method addressed three research questions. There are three sections in this chapter. They are:

1. Explain the justification for research design.
2. Explain the research design.
3. Explain the limitation of the research design.

3.1 The Justification for Choosing a Qualitative Approach

Section 3.1 states the rationale behind the justification for choosing a qualitative approach. Section 3.1.1 discusses the researches niches, which were identified in the literature review, for addressing the research questions. In section 3.1.2 I state the features of qualitative research methodology. In sections 3.1.3 and 3.1.4, I then analyse the process by which a qualitative multiple-site case study approach addressed the research niches of TEB in schools.

3.1.1 Research niches of research questions

In Chapter 2 I identified three major research niches from studying how previous empirical studies addressed the research questions. Research niche one indicates that there is an insufficient understanding of the conceptual and operational definition of TEB. The framework for analysis is constructed by reviewing empirical business studies. This review showed that there is a valuable research niche for me to explore in this study. Research niche two shows that the impacts of TEB in the education context are slightly different from the business sector. There is a different interpretation of some impacts. Even the number of TEB studies of impacts has increased recently; more impacts should be identified by considering the education context. Research niche three reveals that there are many ‘deep-angle’ conditions which have been identified in the business sector. Education

scholars can be viewed through the lens of worthwhile business findings that explore the interaction between schools conditions and TEB in depth.

3.1.2 Features of qualitative research methodology

In order to employ an appropriate research method to address the above research niches, I have reviewed the nature of qualitative research. I have found a wide variety of qualitative research methodologies. In this section, I present four features that relate to this study, summarized by the following statement. Qualitative research is suitable for:

1. Addressing research problems in which variables are not known and need exploring.
2. Emphasizing the inductive analysis for understanding patterns, themes, and interrelationships.
3. Considering personal experience and native viewpoints with empathetic understanding.
4. Understanding the influence of context.

Firstly, qualitative research is best suited to address a research problem. Qualitative research relies on the collection of qualitative data through both a wide-angle and a ‘deep-angle’ lens, which examine the breadth and depth of phenomena to learn more about them (Johnson et al., 2011). Creswell (2004) stated that researchers use qualitative research to probe a topic when the variables and theory base are unknown, for example, if the concept is “immature” due to a conspicuous lack of theory and previous research, or if a notion exists that the available theory may be inaccurate, inappropriate, incorrect, or biased, then there is a need to explore and describe the phenomena and to develop a theory.

Secondly, qualitative research emphasizes the inductive analysis, which is a bottom-up approach to research for discovering essential patterns, themes, and interrelationships. It can involve immersion in the details and specifics of the data in order to study the pattern by exploring and confirming with analytical principles. This is relevant to the concept that not enough is known about to recognize important concerns before undertaking the research.

Thirdly, qualitative research tries to consider personal experience and native viewpoints with empathetic understanding (Patton, 2002). I have direct contact with and get close to the participants to understand their views, which are embedded in their experiences. The focal point thus becomes understanding the issues from the participant's perspectives, not mine.

Fourthly, qualitative research is conducted in a natural setting, which offers an opportunity for me to understand how real-world situations influence participants' perceptions and actions. Qualitative researchers go to the particular setting under study because they are concerned with context (Bogdan et al., 1998). If I understand the natural setting, I can strive to understand the whole picture rather than focus on individual parts. The actions and perceptions of participants can be considered because I look at relationships within systems or cultures and am concerned with the immediate personal interactions.

3.1.3 Rationale of using a qualitative research method

For addressing research niche one, empathetic understanding and inductive analysis features in the qualitative research method facilitated my understanding and defining of TEB. Although there is an insufficient understanding of the conceptual and operational definition of TEB, I can use a qualitative research method to explore this issue. By using the inductive approach, I understand how teachers enacted entrepreneurial behavior and identified the pattern of their behavior at school. This provided a practical understanding of the operational definition of TEB. Moreover, empathetic understanding helped me to grasp the conceptual meaning of TEB. As a result, I had sufficient data to respond to the conceptual research problems.

Inductive analysis and considering the natural setting addressed research niche two. The impact of TEB findings is insufficient and differs slightly from the business sector, because of the context. In order to identify the relevant effects of this in the education sector, I need to understand the natural setting of schools and investigate how these effects are defined. Furthermore, the inductive analysis also assisted me in working out the themes of impacts from the school's perspective. This practice solved the problem of the meaning of variety

in the impact of TEB.

Accordingly, empathetic understanding and consideration of the natural setting enhanced my understanding of the research niche three. The understanding of how schools' conditions enhance TEB is inadequate, unlike the business sector where there is a rich and comprehensive understanding. I need to investigate identifying possible school conditions and understand how they influence teachers in their natural setting. Adopting empathetic understanding also reflects teachers' viewpoints on these conditions. This illustrates the interaction between the schools' conditions and TEB.

To conclude, TEB studies are at an early stage in the academic arena. There is room for education scholars to contribute to constructing the foundational knowledge of TEB. They should adopt qualitative research as an exploratory study (Butin, 2010), because of the immature concept and context in the education sector.

3.1.4 Rationale of using multiple-site case study

In this study, I have decided to use the multiple-site case study by considering the four features of the case study which explain why it is suitable for addressing the research niches.

3.1.4.1 A bounded system for selecting the relevant sample

I located relevant entrepreneurial teachers by using the bounded system for me to identify the boundaries of what the case study is and what it is not (Johnson et al., 2011). Setting boundaries provide a guideline for identifying relevant entrepreneurial teachers. This was the basis for me to study TEB to respond to all research niches.

3.1.4.2 Identifying similarities and differences of TEB

The multiple-site case study can identify similarities and differences, which is worthwhile in defining TEB, the effects and conditions of TEB. As Miles et al. (2014) stated, the multiple-site case study is not aimed at generalization, but promotes the grasping of patterns and themes through identifying similarities and differences among cases from different schools.



3.1.4.3 Analyzing interactions between school conditions and TEB

A case study probes and analyzes the interactions (Best et al., 2006) between school conditions and TEB. The case study offered a chance for me to view the social reality and generate an in-depth understanding of conditions in schools. Furthermore, I could analyze the interactions between conditions and TEB.

3.1.4.4 Illuminate schools' context

A case study helped me to get a close understanding of TEB within the framework of schools. The common research niches of three research questions were the lack of TEB studies conducted in the context of schools. The case study method makes direct observations and collects data from schools in natural settings (Green et al., 2006). I was able to discover how TEB enacts, contributes and interacts under school conditions, which responded to the research niches.

Accordingly, the multiple-site case study is suitable for this study by considering the links between research niches, together with the features of the qualitative research method and the case study. This is appropriate for the education sector because a lot of conceptual knowledge is not identified and consolidated. Hindle et al. (2004) asserted that qualitative methods such as in-depth interviews and case studies were an appropriate approach for understanding the accounting process and behavioral perspectives of entrepreneurial behavior. The multiple-site case study was designed to bring about a deeper understanding of the impact of TEB in schools. Table 3.1 indicates the links between research questions, niches, the features of qualitative research and features of the case study.

Table 3.1. Links between research niches, feature of qualitative research and feature of case study

Research questions	Research niches	Feature of qualitative research	Feature of case study
1. How do teachers and leaders understand and enact TEB and its components?	Insufficient understanding of the definition of TEB: 1. Conceptual definition 2. Operational definition	Addressing research niches: 1. To consider personal experience and native viewpoints with empathetic understanding. 2. Emphasizing the inductive analysis for understanding patterns, themes, and interrelationships.	1. A bounded system for selecting a relevant sample. 2. Identifying similarities and differences of TEB. 3. Illuminate the school context.
2. How do they perceive TEB's impact in schools?	Various meanings of effects in the business and education contexts: 1. Diverse conditions between the business and education sectors.	Addressing research niches: 1a. Conducted in the natural setting for understanding the influence of context. 1b. Emphasizing the inductive analysis for understanding the patterns, themes, and interrelationships	1. A bounded system for selecting a relevant sample. 2. Identifying similarities and differences of TEB. 3. Illuminate the school context.
3. What school conditions enhance or challenge TEB?	Insufficient understanding of how conditions interact with TEB: 1. Lack of in-depth understanding of various conditions. 2. Need to understand the interactive relationship between school conditions and TEB.	Addressing research niches: 1. Conducted in the natural setting to understand the influence of context. 2. To consider personal experience and native viewpoints with empathetic understanding	1. A bounded system for selecting a relevant sample. 2. Identifying similarities and differences of TEB. 3. Analyzing interactions between schools' condition and TEB. 4. Illuminate the school context.

*Common research niche – Studies of TEB is relatively lower under schools' context.

3.2 Research Design

In this section, I explain the rationale of the research design. Section 3.2.1 illustrates how I defined and selected the cases from the research field. In section 3.2.2, I clarify the data collection method. Finally, the analysis methodology is shown in section 3.2.3.

3.2.1 Selection of cases

3.2.1.1 Defining the unit of analysis

This study discusses how school conditions influence TEB. I need to define the unit of analysis for case studies. Yin (2003) asserts that defining the unit of analysis for case studies provides a basis for understanding the nature of the social unit. I also pay attention to conceptual nature, social size, physical location, and temporal boundaries (Miles et al., 2014).

To fulfill the conceptual nature, I attempt to study a teacher, who performs TEB at school. This is the necessary criteria for selecting a sample from the field. In deciding the social size, the basic criteria are teachers who have entrepreneurial behavior. I target teachers who have been awarded such honours as the Chief Executive Award for teaching excellence by the EDB. The primary reason for choosing these teachers is that in order to achieve this award, they must have innovative ideas about teaching. This is the core attribute of TEB. With regard to the physical location and temporal extent, the sample must perform their entrepreneurial behavior at school over a year between 2015 and 2017. This time limit ensures all factors, including teachers, colleagues, students work and school culture, are close to the original setting.

The reason for selecting a sample from these awardees is to ensure the validity of the sample. There is a professional judging panel to assess teachers' performance in their new school-based curriculum strategies. Teachers, who demonstrated their innovation, the ability to manage a project, and initiative in promoting school development in front of the judging panel with documentary support, were awarded. In general, only 20-30 teachers or teams have won this honorary award. The trustworthiness and validity of representing innovative school-based curricula were comparatively higher. The professional judging



panel already selected some outstanding innovative teachers, which was the basic criteria for being an entrepreneurial teacher, for this study. This study is looking for these TEB, in which awardees of teacher excellence satisfy the conceptual nature criteria. They are the social size of this study. What they have done at school has also been evaluated which enables awarded teachers to rethink the reason for their success in performing the entrepreneurial behavior in a new school-based curriculum. Furthermore, awardees needed to demonstrate innovative and outstanding performance in developing teaching and learning school-based curricula at school over a year between 2014 and 2017. This means they fulfill the criteria of physical location and temporal extent. With the screening by the professional judging panel, there are higher chances of locating teachers who have entrepreneurial behavior. This enhances the validity of this study. Table 3.2 illustrates how this research population fulfills the criteria of the unit of analysis.

Table 3.2. Links between the criteria of unit of analysis and research population

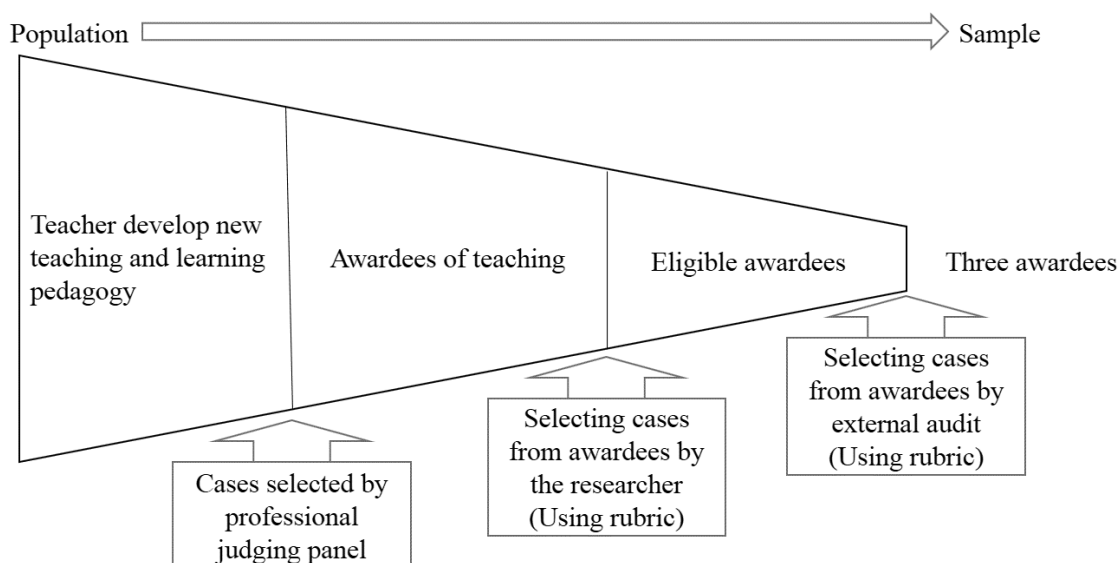
	Criteria	Population: Awardees of teaching
Conceptual nature	TEB	Perform innovation, an ability to plan and manage a project, risk-taking in failure, take initiative to develop a new school-based curriculum
Social size	Entrepreneurial teacher	All awardees of teaching excellence etc.
Physical location	Schools in Hong Kong	All awardees must implement their new school-based curriculum in schools.
Temporal extent	Implement new school-based curriculum over a year between 2014 and 2017	All awardees need to implement their new school-based curriculum over a year.
Enhanced validity with screening by a professional judging panel.		

3.2.1.2 Process of selecting cases

This study adopts purposeful sampling (Creswell, 2004) to develop a detailed understanding of TEB. Although the awardees of teaching excellence fulfilled the essential requirement of innovative behavior in promoting a new school-based curriculum, I needed to identify teachers with most entrepreneurial behavior amongst the awardees. Therefore, I set the criteria for screening out three suitable cases from different schools for this study. This could strengthen the precision, the trustworthiness, and the stability of the findings (Miles et al., 2014). The process of selecting cases was as follows and is presented in figure

3.1:

Figure 3.1. The process of selecting cases



Step 1 – Cases selected by professional judging panel

The purpose of step one is identifying teachers, who perform innovative behavior in teaching. The professional judging panel of teaching excellence has clear criteria for judging the innovative contribution of teachers' school-based curricula. This judging panel is formed from teaching experts, principals, education bureau officers, and scholars. They validate the innovative contribution of awardees in teaching and learning. I can take advantage of these professional judging panels to screen out the irrelevant sample at step one.

Step 2 – Setting criteria for selecting sample

The purpose of step two is to discover teachers who display most characteristics of TEB, especially risk-taking. All awardees are supposed to have innovative behavior, including employing updated pedagogy in the curriculum. However, they may not perform other characteristics of entrepreneurial behavior, such as planning and managing projects or risk-taking. To address this issue, I compiled a four-point scale rubric for assessing the valid awardees for this study.

In developing the criteria of the rubric, I considered the trustworthiness and adaptability in

assessing the awardees. To increase the trustworthiness of the sample I used the criteria based on section 2.1 of the literature review. This evaluated the awardees' entrepreneurial behavior in innovation, risk-taking, the ability to plan and manage a project, autonomy with a positive attitude, and seeking external resources. I developed the descriptor for each category by using the definition of each entrepreneurial behavior. Furthermore, I tried to modify the wording to fit into the education context. Table 3.3 indicates the first version of the rubric. However, the one fatal weakness in this rubric is its trustworthiness. (See **appendix four**)

To enhance the trustworthiness of the rubric, I invited experts in studying entrepreneurship to verify the worthiness of its content. According to their comments, the theoretical definition is acceptable. However, the first version of the rubric descriptor was general and merely divided teachers' performance into five levels. This vague descriptor made it difficult for the assessor to review TEB in the education context. To address the problem of adaptability of assessment in the school context, I decided to review 'Chief Executive's Award for Teaching Excellence Indicators' and 'Teacher competence framework'. The reason for using these data to modify the rubric was that they contextualized the school's practice in assessing teachers' performance. I selected some items, which are related to TEB and based on these items, I conveyed these descriptors of teachers' competencies into the operational definition of TEB for the rubric. To verify the level descriptor of various categories, I invited experts in studying entrepreneurship and experienced principals to comment on the ranking descriptor of the rubric by considering the school context. Through the support of literature (Theoretical); Chief Executive's Award for Teaching Excellence Indicators; 'Teacher competence framework' (Practical); and peer review (Verifying), I enhanced the trustworthiness and adaptability of the rubric the final version of which is illustrated in Table 3.3.

Table 3.3. Final version of the rubric for assessing TEB:

	Threshold	Competent	Proficient	Accomplished
Innovation	Shows adequate knowledge of teaching the school-based curriculum ; able to give attention to and care about students' learning needs and performance.	Shows rich knowledge and understanding of teaching the school-based curriculum ; demonstrates good teaching practices; maintains an inspiring learning environment to guide students in their learning.	Shows mastery of using different incremental teaching of the school-based curriculum ; designs appropriate learning and teaching activities with learning experiences so that they can cultivate knowledge and develop positive values and attitudes.	Effectively demonstrates and models excellent performance by adopting radical new teaching and learning methods to deliver the school-based curriculum ; uses a wide range of teaching resources as well as learning activities for students to cater for learner diversity.
Risk-taking	Makes occasional attempts to follow the new school-based curriculum under the school's established policies and practices. (Steps out of comfort zone without sacrifice).	Pays attention to identifying an opportunity for promoting the new school-based curriculum while understanding the reasons behind established procedures and practices. (Steps out of comfort zone personally without sacrifice).	Identifies appropriate opportunities for promoting the new school-based curriculum under school plans, in agreement with school goals and policies; takes measures to address the impact of societal changes on school development. (Encourage the whole department to step out of their comfort zones with appropriate costs).	Effectively identifies opportunities for promoting the new school-based curriculum under uncertain conditions; Promotes awareness and knowledge of societal changes amongst colleagues to ensure continuous school development. (Encourages the whole school to step out of their comfort zones with higher potential costs).
The ability to plan and manage a project	Mainly follows previous practices when planning activities and programmes; has a vague idea of the expected outcomes of such activities and programmes; effectively implements the school-based curriculum.	Attempts with some success, to deploy , and utilize both internal and external resources for the effective implementation of the school-based curriculum.	Works in close collaboration with colleagues in curriculum adaptation and innovation in order to continue developing and improving the school-based curriculum as planned.	Demonstrates curriculum leadership in the development of the school-based curriculum; makes active contributions to school-based curriculum decisions including planning, organization, implementation, and evaluation. Has clear ideas and well defined goals.
Autonomy with a positive attitude	Regularly updates and searches for new subject matter knowledge with a view to enriching content knowledge of related subjects. Ready to participate in the process of formulating new school policies and reviewing the established procedures and practices when invited to.	Frequently updates and searches for new subject matter knowledge about current curriculum developments as well as emerging educational initiatives and priorities; shows concern for formulating school policies.	Initiates updating and searching for new subject matter knowledge to achieve excellence in teaching and learning; shows great concern for the formulation of new school policies and the review of established procedures and practices.	Promotes the searching for and updating of, new subject matter knowledge in response to current curriculum developments and emerging educational initiatives. Makes substantial contributions to the planning and formulation of school policies, procedures, and practices by expressing own views as well as giving concrete suggestions.
Seeking external resources	Attends sharing and exchange sessions on teaching practice in specific subject areas within the school when invited to.	Participates voluntarily in sharing sessions and makes sporadic contributions to the exchange of ideas on teaching practice in specific subject areas within the school.	Participates actively in gathering, sharing and exchange sessions and makes frequent contributions; gathers resources within as well as outside school.	Takes a lead in gathering, sharing and conducting the exchange of ideas on good teaching practice in specific subject areas within the profession.

I analyzed the awardees' booklet using the finalized rubric. The awardees' booklet is published by all awardees to describe their rationale behind the implementation of a new school-based curriculum in schools. It is useful for me to understand what they have done in developing a new school-based curriculum and through analyzing this booklet, I can identify eligible awardees for the next step.

Step 3 – Selecting cases from awardees by external audit

In order to enhance confidence and trustworthiness in selecting the sample, I invited an entrepreneurial studies scholar, an experienced vice-principal and academic affair in-charge to be the external auditors for selecting cases. This was a qualitative Delphi method, using anonymous responses, in selecting the cases (Skulmoski et al., 2007). I then sent the eligible awardees' booklet and rubric to the auditors who have over 15-year experiences in their positions. They assessed these booklets using the rubric. Finally, eligible participants, who fulfilled the entrepreneurial behavior, were selected to be the participants in this study.

The reason for selecting three cases was that I wanted to balance the quality of findings and utilities of qualitative research methods. A case study offered an optimal environment for me to conduct an in-depth analysis. Common features could be identified by using a multiple-case study. I needed to consider the quality of the findings. This research was not aimed at generalization but at understanding the nature of TEB in schools. Because of the constraints of time and workforce, I needed to slim it down to three cases to ensure the quality of data collection and analysis.

Appendix five shows the ranking of awarded schools. There have been 18 awarded schools in the past three years. The judges and I assessed the awarded schools' reports and their marked scores. To ensure the consistency of the marking system, I reviewed the diversity among the judges' marking. When the difference of a specific category's score was 2 or the above, I approached the third parties (Professional expert) to verify the differences. With reference to the marking result, no modification has been made.

This study focuses on studying typical entrepreneurial teachers, who develop innovative curriculum or initiatives in schools. I use the rubric to serve as a theoretical sampling tool. This purposeful sampling ensures that I can select a high performing TEB sample from the population for in-depth investigation.

On the other hand, CEATE's changing annual themes enhances the variety of school context for this study. Since the time range of selecting samples is from 2014-2017, my sample schools were selected from 12 domains in total. According to the selection result, case one is a traditional school representing normal schools; case two is a prestige school representing elite schools; case three is a special needs school representing an underprivileged school. This combination indicates a higher variety of sample schools that served as a good representation of different school background in Hong Kong. Generally speaking, this sampling minimizes the error of drawing irrelevant entrepreneurial teachers from CEATE, and maximizes the variety of school conditions.

3.2.1.3 Negotiation to access

The two ways for me to access the potential participants were to cold call and use a referral. **Appendix six** presents the method of accessing potential participants and the results.

Cold call

I took the initiative to contact the targeted awardees by phone. These targeted awardees are the gatekeepers for me to access the research site. Three awarded schools agreed to participate in this study. Coincidentally, awardees are the gatekeepers for facilitating the interview arrangements. One point which should be highlighted is that they treated their participation as a social responsibility to the education sector. There was one rejection from awarded school 15; the reason was to protect the confidentiality of the school.

Referral

As the judge of the Business Teacher Award, I had an opportunity to approach the potential participants directly. This network ensured I could connect with the potential participants as a gatekeeper. Nevertheless, I was turned down by the principal from awarded school

two. On the other hand, my wife is a teacher and my contact person in awarded school four. I discovered that the principal of awarded school four had been changed in the past three years. Considering this, I decided to pick one more sample to ensure the trustworthiness of this study.

3.2.2 Data collection

3.2.2.1 Triangulation

Triangulation is a strategy that enhances the validity of this research. This involves using different methods as a check on one another, seeing if methods with different strengths and limitations all support a single conclusion (Maxwell, 2013). The purpose of using various collection methods is to respond to the research questions with a single conclusion. The questions are ‘what is TEB’? ‘what is the impact of that behavior’? and ‘how do conditions influence that behavior’? In this study, I collected data from three groups of participants - the entrepreneurial teachers (awardees), principals, and colleagues. The channels for collecting data were an in-depth semi-structured interview, school documents, and physical artifacts. In each case, data is collected through similar channels.

3.2.2.2 Data collection methods

There are four data collection methods for this study.

School documents

There were various school documents reflecting the rationale, implementation process, result, and evaluation of the new school-based curriculum. This planning and reporting provide effective data for me to understand the rationale and implementation of that curriculum in school. Every entrepreneurial teacher must have a plan and report for their new school-based curriculum. Studying this plan and report enhances my understanding of the strategy behind the teacher’s new school-based curriculum, which allows me to tailor the interview questions to individual participants. Moreover, I can assess the data as written evidence to support what the participants’ said (Creswell, 2004). This crosschecks the accuracy of participants’ responses and helps refine the interview questions for other participants.

Furthermore, the plan and report of the new school-based curriculum included the rationale behind it and teachers' reflections on implementing it. I can study how teachers enacted their entrepreneurial behavior and understand their belief in the implementation process. On the other hand, the report of the new school-based curriculum indicated evidence of the impact of TEB on different aspects, such as students' performance (Yin, 2003), colleagues' feedback on implementation and the effective use of resources. These are valuable data for me to understand the links between how TEB is enacted and its impact.

There were some school policies to support the entrepreneurial teachers' new school-based curriculum. For instance, I reviewed the publication of the school policy, which is mentioned by the principal to support TEB, in order to understand the influence of the school's conditions on TEB. These are the secondary sources to support the principal's claim.

Interviews

I interviewed entrepreneurial teachers, principals, and their colleagues. Considering the purpose of this study, I focused on defining TEB, the impact of that behavior, and how conditions influence it. The primary sources of addressing the research purposes are the expression of perceptions and beliefs of entrepreneurial teachers, principals, and their colleagues. Therefore, I used the interview guide approach to explore these three topics and to ask specific open-ended questions of the participants (Johnson et al., 2011). In general, I prepared a set of questions, which aligned with the framework for analysis in section 2.4. Meanwhile, I kept a relatively unstructured interaction with participants for probing, changing direction, and maintaining a degree of flexibility.

I interviewed three groups of participants which fulfilled the purpose of triangulation in answering research questions. First, entrepreneurial teachers are the crucial participants in this study. Their response reflected the meaning of TEB, indicated the impact of their behavior, and their interaction with the school's conditions. Second, other teachers, who work closely with entrepreneurial teachers or nominate the entrepreneurial teacher for the

award, provide another perspective on entrepreneurial teachers' behavior at school. Depending on the number of teachers involved in the new school-based curriculum I interviewed between three and five teachers. Third, the principal is responsible for constructing the schools' condition for teachers. Principal's interview data can be cross-checked with teachers' perceptions of the school's conditions. Furthermore, interviewing the principal also reveals how TEB was enacted and how it impacted their school. Interviewing these participants provided an opportunity for me to understand TEB with corroborating evidence from different perspectives. In case one, I interviewed an entrepreneurial teacher (Mathematics subject coordinator), principal, vice-principal, three core team members from the Mathematics subject, and three mathematics subject teachers. In case two, I interviewed an entrepreneurial teacher (Curriculum coordinator), principal, vice-principal, Chinese subject coordinator, English subject coordinator, Mathematics subject coordinator, and General Studies subject coordinator. In case three, I interviewed entrepreneurial teachers (Vice-principal and subject coordinator), principal, social worker, Music teacher, Mathematics teacher, and Physical and Health teacher. For the times of interview, I interviewed the entrepreneurial teacher first (60 minutes) to understand the innovative idea and implementation process. Then, I interviewed all participant one-by-one (120 minutes). I went backward to interview the entrepreneurial teachers (120 minutes) after interviewing all participants. All interview data were recorded by reflective memo (see section 3.2.3.3) and audio recordings. To ensure the participant to express their idea clearly, all interviews were conducted in Cantonese.

Students' work

I also studied students' work to assess the impact of TEB. The purpose of introducing a new school-based curriculum was to enhance the quality of education in schools. With reference to the literature review; nearly all empirical studies indicated that TEB aided the school's general performance. Green et al. (2006) suggested that reviewing physical artifacts (Students' work) provides multiple sources of evidence for triangulation. In addition, reviewing students' work also gave me an opportunity to see whether their particular new school-based curriculum matched the primary purpose of developing a new school-based curriculum in schools.

The purpose of collecting students' work is to ensure the implementation of the innovative idea and student learning performance echoing what did interviewee said. This is a triangulation. With school permission, I reviewed different students' work in three schools. (see table 3.4) In case one, I reviewed the students' assignment and extra-curricular materials. This work reflects the integration of teachers' innovation in teaching and learning and the students' engagement in studying mathematics. In case two, I reviewed students' assignment (Workbook, drawing, etc.) with high, middle, and low-level performance. These assignments indicated how teachers connect the curriculum to the assessment and show students' academic performance. In case three, I reviewed students' learning videos. Their assignments are video-taped to record their learning process. Therefore, I checked whether students' video echoes what they learnt through the innovative curriculum.

Lesson observation

Despite the evaluative nature of the study, classroom observations were helpful to understand the context of TEB and whether or not TEB is sustained. Context implies the setting of school's conditions, such as students' learning attitudes, resources they have, etc. Sustained implies the continuity of the innovative curriculum. The reason for checking the continuity is that many innovative ideas are a fast fix without sustainability. I explored the sustainability of their innovative idea by checking whether they continuously delivery the curriculum or employ innovative pedagogy in the lesson. While I investigated the impact on students' learning of the implementation of a new school-based curriculum, I also explored what kind of conditions affect the sustainability of TEB. I negotiated the number of lesson observation with the participating schools. In case one, I observed two lessons for primary three and four pupils, which were conducted by an entrepreneurial teacher and one subject teacher. In case two, three lesson observations were conducted for primary 5 Chinese and English, and primary 6 Mathematics subject. In case three, I observed music, physical education and health lessons. All lesson observations provided evidence to triangulate with interview data. Therefore, the focus of lesson observation was on the enactment of innovations in actual lessons. I recorded the evidence in the form of field

notes. One point it is important is that video or photo recording was not allowed in the observation. These schools would like to ensure the privacy of their teachers and students. Accordingly, I have not reported any photo or data about lesson observation in this thesis. However, the lesson observations helped me to screen out some claims from teachers, which have no students' work or lesson observation support. This enhanced the trustworthiness of the data.

3.2.2.3 Trustworthiness

Maintaining the trustworthiness of the study is not easy when interviewing. In this section, I explain how I enhanced the trustworthiness of this study by modifying the interview questions, establishing interview principles and exploring potential data collection channels.

Modifying the interview questions

The trustworthiness of the semi-structured interview questions, being the crucial data collection channel, had a direct impact on this study, as shown in figure 3.2. Trustworthiness is higher when the interview is based on a carefully designed structure (Best et al., 2006). There were two steps to developing higher trustworthiness interview questions for the participant.

Step 1 – Enhancing theoretical trustworthiness

I constructed a sample of interview questions by reviewing the literature review and entrepreneurial teachers' booklet. These sample questions were verified via an external audit by an expert in studying entrepreneurship in Hong Kong. Based on their comments, I modified the research questions by avoiding leading and close-ended questions. This is often done in exploratory research or when investigating a concept about which the researcher does not know much (Friesen, 2010).

Step 2 – Enhancing practical trustworthiness

In order to enhance the practical trustworthiness of the interview questions, I conducted a pilot interview with an entrepreneurial teacher from the university. She was the winner of

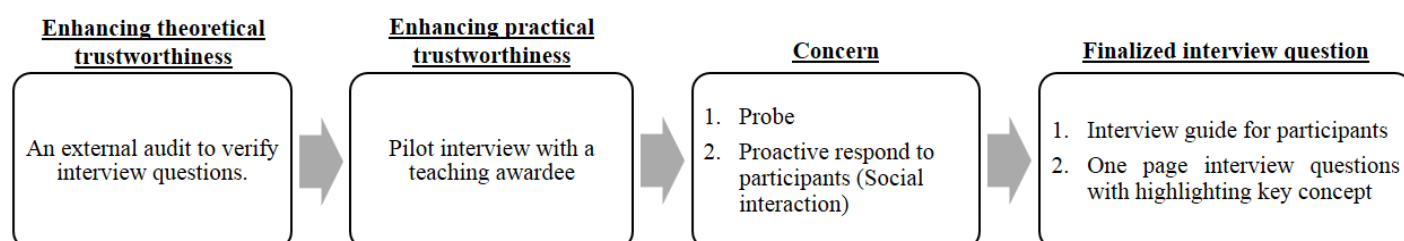
an excellent teaching award in the university for her innovative program design. Based on her feedback, two significant amendments were made.

First, I designed a one-page interview guide for the participant. The purpose of qualitative interviewing is the elicitation of narrative stories from the respondents that indicate the meanings they give to aspects of their life and world relevant to the interviewer's topic (Warren et al., 2010). Therefore, the interview guide aimed at recalling participants' memories of their authentic experiences in developing a new school-based curriculum for teaching and learning. Considering participants' responses, I prepared to probe for clarification or prompt for additional details. Because the use of prompts and probes depends on the respondent's narrative, they are difficult to specify in advance (Warren et al., 2010). I modified probes by reviewing the entrepreneurial teachers' report and a previous interview from the same school.

Second, all research questions were condensed onto one page, and critical concepts were highlighted for me. Interviews are a special form of social interaction in which there is a need to respond to the stimulation of another (Dick, 2006; Palmer, 1928). Condensing all questions and highlighting key concepts on one page allowed me to identify the links between a participant's responses and theoretical concepts. Based on their answers, I was able to ask and probe related concepts proactively.

Based on the above amendments, I finalized the interview questions. **Appendix seven** is the interview guide for participants and interview questions. This process ensures these interview questions were reviewed by the academic and the experienced teacher. These questions were conceptually and practically accommodating within the education context because they encouraged participants to tell their stories.

Figure 3.2 Process of modifying the interview questions



Establishing interview principles

There are two basic principles in interviewing the participants - higher flexibility and interview triangulation. To achieve flexibility, I designed a cover page stating the reminder, rationale, and theoretical framework for the interview questions. The interviewer's desire to know something impels the interaction (Dick, 2006). Higher flexibility in interviewing participants means my disposition and ability to improvise in the back-and-forth of question asking and answering, greatly influenced the interaction of an interview (Russell, 2005, Warren et al., 2010). In order to achieve higher flexibility, the cover page served as a reminder for me to be open-minded and flexible in asking the questions by staying focused on the theoretical framework. To achieve interview triangulation, I maximized the benefit of interviewing various stakeholders to reflect the reality of entrepreneurial teachers' attributes. Although reviewing participants' reports and adjusting interview questions enhanced the validity of the interview (Friesen, 2010), I encountered difficulty in identifying teacher entrepreneurial behavior by interviewing entrepreneurial teachers. Most entrepreneurial teachers are humble and share their view of education with sufficient evidence. Based on this evidence, I revised interview questions for principals and colleagues to cross-check teacher entrepreneurial behavior in action. Hence, interview triangulation is a vital principle for me to amend interview questions and to understand entrepreneurial behavior from the stakeholder perspective.

Exploring potential data collection channel

In order to enhance the confidence of triangulation, I investigated other evidence by using different data collection channels. Based on the participants' responses, I approached participants to provide evidence, other than school documents and students' work, to

support their claim. Table 3.4 indicates the data collection channels from participating schools.

Table 3.4. Links between data collection channels and research questions from sample schools

School A	Data collection channels							
RQ	School's documents			Interview			Students' work	Lesson Observation
	Plan and report	School's publication	Teaching material	Entrepreneurial teachers	Principal	Colleagues		
RQ1	✓		✓ (Note and Video)	✓	✓	✓		✓
RQ2	✓	✓		✓	✓	✓	✓	✓
RQ3	✓			✓	✓	✓		
School B	Data collection channels							
RQ	School's documents			Interview			Students' work	Lesson Observation
	Plan and report	School's publication	Teaching material	Entrepreneurial teachers	Principal	Colleagues		
RQ1	✓			✓	✓	✓		✓
RQ2	✓			✓	✓	✓	✓	✓
RQ3	✓			✓	✓	✓		
School C	Data collection channels							
RQ	School's documents			Interview			Students' work	Lesson Observation
	Plan and report	School's publication	Teaching material	Entrepreneurial teachers	Principal	Colleagues		
RQ1	✓		✓	✓	✓	✓		✓
RQ2	✓	✓		✓	✓	✓	✓	✓
RQ3	✓			✓	✓	✓		

The above table shows that I address all research questions by conducting the interview and studying their plan and report. For obtaining the triangulation strategies, I approached participants for other evidence on a voluntary basis. Therefore, there were a variety of data collection channels from different schools. Although this affects trust, this practice enhances the validity of this study by fulfilling the principle of triangulation in the schools' context.

To conclude, I am committed to ensuring the confidence and trustworthiness of data collected as a response to the research questions. Although the interview was the paramount channel in answering the research questions, other channels were essential tools for me to gather corroborating evidence.

3.2.3 Data analysis

I state the data analysis strategy in this section. In section 3.2.3.1, I explain the importance of reflexivity on this research. Section 3.2.3.3 and 3.2.3.4 demonstrate the process of analysis in the initial and second stages of this study.

3.2.3.1 Reflexivity

Enhanced reflexivity on the study results is crucial to ensure the trustworthiness of data analysis. Since the interview was conducted in Cantonese, I translated all interview data into English. To enhance the reflexivity and quality of the translation, I invited linguistic and translation studies graduates to audit the translation. The major problem of analyzing qualitative data is my bias in finding what I want to find. I have the responsibility to engage in critical self-reflection about potential biases and predispositions (Ashmore, 1989), especially in the coding process. Miles et al. (2014) recommend that there are descriptive codes, interpretive codes and pattern codes in the coding analysis. These codes provide a deeper understanding and objective analysis of the complex issue of TEB.

With regard to the descriptive codes, they provide a clear description of the school conditions and the impact of TEB. In order to enhance the reflexivity of descriptive codes, I adopted the triangulation strategy by reviewing schools' documents and students' work. Furthermore, a rich description of the context and operation of the case also facilitate the coding process.

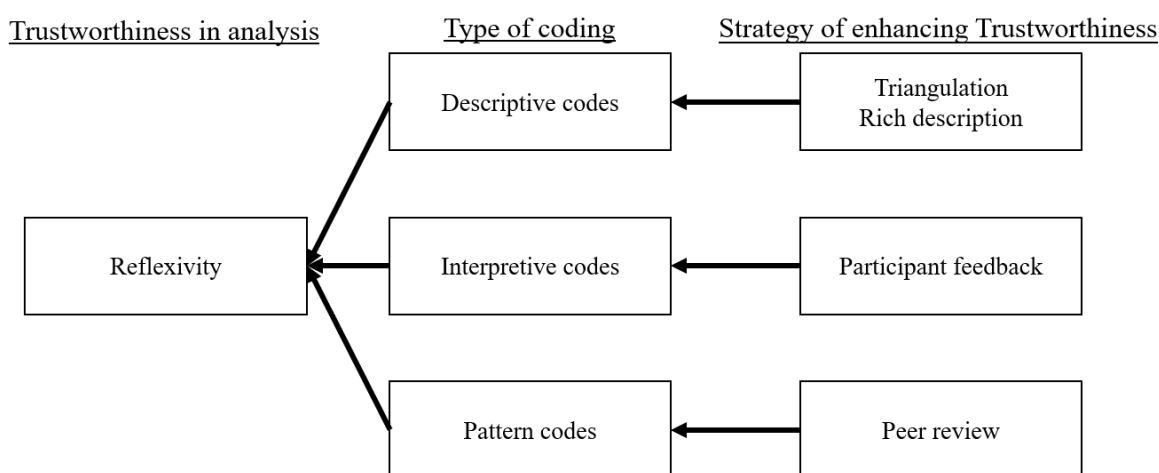
Coding interpretive codes is a challenging task for me. I needed to apply an empathic stance in understanding participants' viewpoints. Participant feedback was used in this study (Corbin et al., 2015). I look for participant feedback once I have completed coding for a specific participant. Although it takes time, this construction of coding strategies can reflect participants' authentic views.

Peer review is the strategy by which I enhanced the reflexivity consideration of pattern coding. Pattern coding is coding for the sequence, similarity, and frequency, in the data. Based on the framework for analysis guidance, I categorized data in the coding process. I

discussed the categorizing strategy with colleagues to identify any problems in it (Johnson et al., 2011).

The above strategies enhanced the reflexivity of coding data. I can capture precise meaning from the data collected in order to understand TEB in school. Figure 3.3 indicates how these strategies promoted the reflexivity of study.

Figure 3.3 Ways of enhancing reflexivity



3.2.3.2 Process of data analysis

This section aims at explaining the rationale of the general process of data analysis by following the Miles and Huberman interactive model of data analysis (2014). Because this study is a multiple-site case study in which I went to three different research sites to collect data, there are two stages of data analysis. Some data is analyzed during data collection, and some data is analyzed after data collection from the three research sites. The purposes of analysis are different in two stages. Therefore, there is a slight change in the model of data analysis, which is explained in section 3.2.3.3.

In general, Miles et al. (2014) define analysis as consisting of three concurrent flows of activity following data collection. First, data reduction refers to selecting, focusing, simplifying, extracting and transforming the data, deciding which data chunks to code, pull out, and summarize. Second, data display is an organized, compressed assembly of

information that permits the drawing of conclusions and action. Finally, conclusion drawing and verification is to reach a conclusion by noting regularities, pattern, explanations, and casual flows. The three stages of analysis influence each other at the same time.

3.2.3.3 Process of data analysis in the initial stage

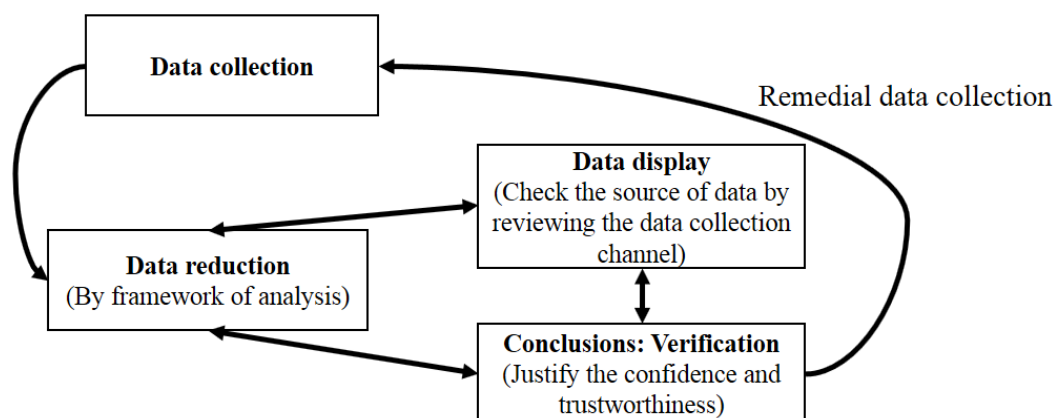
The purpose of conducting an initial analysis in the research site is to enhance the confidence in and trustworthiness of data. Although data collection and analysis are explained distinctly, in practice the two are often blended with analysis occurring throughout the collection stage. I have the responsibility to identify the possible threat to confidence in and trustworthiness of the data collection process by conducting initial analysis in the research site. Figure 3.4 illustrates the process of data analysis in the initial stage, while **appendix eight** shows the example of the initial analysis checklist.

The reflective memo is a practical action for me to conduct the initial analysis in the research site. According to the model of data analysis, I write a memo after conducting the interview and studying the school's documents. This is a data reduction process in which I temporarily categorize data by reviewing the framework for analysis. I also use the data display strategy to check the sources of these data by reviewing the data collection channel. Then, I verify the validity and trustworthiness of these data by compiling the interim case summary. This presents a review of findings, checks the quality of data and considers the next waves of data collection (Miles et al., 2014). Once I identify any doubtful data, a remedial data collection can be conducted at the research site. This practice is also beneficial to me in modifying data collection strategies in the other research sites.

There is a threat to trustworthiness in describing TEB. I found that the working style of the entrepreneurial teacher is not measurable or observable when I stayed in their school. Their attributes only show in handling rare events. To address this difficulty, I asked participants to provide a concrete example of illustrating TEB. Meanwhile, I checked the trustworthiness of their description with other participants. The cross-checking interview was maximizing the advantage of the triangulation interview.

Bogdan et al. (1998), a reflection memo provides an opportunity for me to reflect upon the theoretical, methodological and substantive issues. The initial stages of data analysis enhance the confidence and trustworthiness, but also inspire me in the second stages of data analysis on theoretical issues.

Figure 3.4 Process of data analysis in the initial stage



3.2.3.3 Process of data analysis in the second stage

The purpose of the second stage of data analysis is to identify the patterns and themes of data in order to understand the links between them. This process facilitates my understanding of how these analyses respond to the research questions. One point which is pivotal is that all data were in Chinese. To ensure the trustworthiness of coding, I analyzed the Chinese data then converted them into English.

Data reduction

There are two coding strategies in the data reduction. First, I encode the data by categorizing into descriptive, interpretive, and pattern codes. **Appendix nine** shows the example of encoding data. This is a systematic coding strategy for me to organize the primary data and identify essential keywords from raw data. Descriptive codes indicate the factual information, while interpretive systems reveal participants' belief. For the pattern codes, initially I coded the data into conceptual terms with the framework for analysis. After the first coding process, I have primary codes by considering the factual information, participants' belief, and basic conceptual items. Obviously, the above coding process is the deductive approach to encoding TEB, the impact of TEB, and conditions which enhance it.

This practice is crucial for data display because I need to use this deductive data to identify the theme.

Second, I reviewed the ‘framework for analysis’ to categorize codes using a codes book. The framework for analysis is an effective tool for me to identify promising codes and the best defense against overload (Miles et al., 2014). At the same time, I needed to be alert to the surprising codes that were not anticipated at the beginning of the study (Creswell, 2014). Through this process, various codes transformed into different patterns, such as opportunity recognition, creativity, etc. To ensure the trustworthiness of coding, I developed a codebook starting from analyzing case one. I continuously categorized all codes into descriptive, interpretive, and pattern codes by considering the framework for analysis. Every code has its description, which became a reference for me to standardize the coding in other cases. The codebook was reviewed by my external reviewer to ensure the trustworthiness of the code and its’ description. **Appendix ten** is the codebook for the coding process.

Data display

Based on the categorized pattern, the data display aims at identifying the theme of various patterns and discovers the links among these themes. First, I used the analytic technique of pattern-matching to determine the theme of these patterns (Green et al., 2006) by reviewing the framework for analysis. As shown in table 3.5, this practice combines the deductive and inductive approaches to categorizing the theme for data. Which echoes the purpose of this research by employing the mixed approach (see Chapter 2 – Section 2.1.2) to define TEB.

Table 3.5 Illustration of pattern-matching with mixed approach

Interview Topic	Descriptive code	Interpretive code	Pattern	Theme	Description
1. The rationale for promoting new teaching and learning pedagogy at school	Developed subject-based curriculum	Concern students' learning	Autonomy	Autonomy with a positive attitude	Because of concerning student's learning difficulties, teachers decided to develop new method to help students to learning.
			Common Good		Teacher believe in joy of learning.
		Problem-solving	Creativity	Innovation	Based on existing pedagogy, teachers develop new pedagogy to consolidate students' learning.
2. The rationale for promoting new teaching and learning pedagogy.	Developed teaching materials	Identify the problem	Opportunity recognition	Risk-taking	Teacher found that students have difficulties that tailor made a methodology to cater their needs.


Identifying themes with the mixed approach, categorizing the major themes and discovering the links among themes and patterns is the second step for data display. In general, at least three major themes should be identified in the data display section. They are TEB, the impact of TEB, and the influence of school conditions. Within the three major themes, there are several themes to explain the operational mechanism of TEB, its' impact, and the conditions for it. Table 3.6 demonstrates the process of linking themes to the major theme, while I use the concept map, as shown in **appendix eleven**, to discover the interconnection among themes and patterns (Creswell, 2014). This process indicates the links between patterns under a specific theme as an additional layer.

Conclusions

In the conclusion process, this study responds to research questions and compiles results. First, concerning the analysis of data reduction and data display, temporary findings need to be formed. I tend to match the findings to answer the research questions. If there is an unanswered part, I need to go through to whole analysis process to identify the missing link or limitation of this study. Second, I state the similar and different findings among schools separately. After that, I analyze the reason for similarities and differences.

To conclude, three parts of data analysis interact with each other (See figure 3.5). I transformed data into codes and patterns in the data reduction section. Themes and links among patterns and themes are compiled by using data display strategies. As a result, I can check to see whether the research findings respond to the research question and verify the data analysis.

Table 3.6 Links between themes and major themes

Major theme	Theme	Pattern	Interview Topic	Descriptive code	Interpretive code	
<div>Entrepreneurial behavior</div> 	The ability to plan and manage a project	Well-organized with serious attitude	B5. Impact on teachers and students	Developed subject-based curriculum	Enhancing colleagues participation	
					Systematic management style	
		Persistent	A8. Working style	Formal meeting	Having core team member	
					Clear focus in new pedagogy	
		Understanding colleagues ability and character	A4. The impact on teachers	Formalizing teacher character	Confidence with positive reinforcement	
					Student participation in Developed teaching materials	Constructing positive learning atmosphere for students
				Seed project for sampling	A9. Development of new pedagogy	Developed subject-based materials
		Problem-solving				
		New Item 4 (Behavior) - Humility-Confidence	Humble	B12. Subject panel leadership	/	Identify colleagues talent
						Low profile with goal
	Open-minded					
	Seeking for external resources	External resources	A13. Handling difficulties	Difficulties in technical problem	Problem-solving	
			B10. Network outside	Collecting others school information	/	
	Impact of entrepreneurial behavior (Team)	Risk-taking with higher job satisfaction	Potential risk	A4. The impact on teachers	Formalizing teacher character	Confidence with positive reinforcement
Job satisfaction			A9. Development of new pedagogy	Developed subject-based materials	Concern school operation	
					Problem-solving	

Data display:
2. Linking theme to major theme

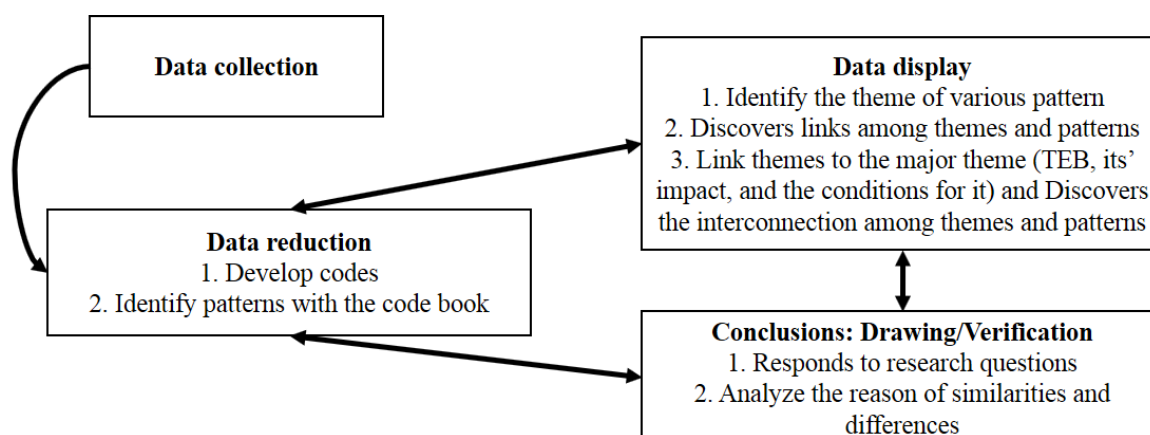
Data display:
1. Pattern matching



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Figure 3.5 Process of data analysis in the second stage



3.3 Limitation of Study

3.3.1 Ethical issue

As a judge of outstanding business teachers, I may exhibit involuntary bias in selecting participants. Maxwell (2013) stated that the relationship between interviewees and oneself depends on the ethical and political background - I may favor some potential participants. In order to avoid this problem, I invite external audit in the selection process. This can minimize any bias in selecting participants. Furthermore, being a judge provides an opportunity for me to understand the detailed operation of schools and the new school-based curriculum. This background information enabled me to form interview questions which fit the schools' context.

Furthermore, I approached all participants to sign a consent form before the interview (See Appendix). The form explains their rights to withdraw from the study, measures to respect confidentiality, and the scope of data use. Further, to respect privacy, most students' work and lesson observation findings were used only to confirm teachers' innovative practices and, unless the school approved, were not presented in the thesis.

3.3.2 Number of cases

This study collected data from three schools only. The actual enactment, impact, and condition of TEB may vary from different schools in Hong Kong, because TEB relies heavily on the situated context. The more samples selected, the greater the potential variety

of examples of TEB. However, the importance of understanding the situated context is also the reason for selecting three samples only. TEB has a strong interaction with the school context that requires in-depth investigation in the research site, which is time-consuming. Collecting data from all awarded schools is impossible given limited human resources and time.

Furthermore, generalization to a larger population is not the major purpose of case study research (Yin, 1993). This research determined to ensure the depth of understanding TEB from three cases. Therefore, I employed multiple data collection channels (See Table 3.4) to explore and conceptualize the concrete meaning of TEB. Referring to table 3.1, the multiple-site case study can address an insufficient understanding of TEB by interpreting its impact and the influence school conditions have over it (Eisenhardt & Graebner, 2007). This promotes prior empirical and theoretical knowledge that facilitates comparison and theory building (Stake, 2010). Then, A further quantitative study can be conducted when the conceptual foundation of TEB is well-established with more empirical studies.

3.3.3 Selection process

Although using the rubric allow me to identify potential participants with TEB, it limits the variety of findings of TEB. As the rubric is based on the literature review and teacher professional competence framework, the selected samples TEB might be closely related to the five TEB attributes. However, the literature review indicated that there is a need to contextualize the meaning of EEB with a concrete explanation for the education sector (i.e., TEB). The rubric synthesized theoretical and practical findings from the business and education sector that contribute to identifying entrepreneurial teachers. With the support of rubric in sampling, this study targets the relevant sample and promotes the concrete and theoretical understandings of TEB in the Hong Kong school context. It also fulfills the purpose of enhancing the depth of this study. As I alert the limitation of restricting the variety of findings of TEB, for remedying this issue, I maintained a high degree of flexibility for the participants to express their authentic experience in developing school-based curriculum. This approach empowered me to discover more entrepreneurial behaviors from participants instead of limiting to five attributes.

3.3.4 Interviewees

As mentioned in section 3.2.2.2, the interviews participants were entrepreneurial teachers, teachers, and principals. This reflects the scope of the research questions that focus on teacher and principal perceptions of TEB and its enactment. Collecting student data would have been unnecessary to this research (which did not focus on the impact on student outcomes) and therefore would have imposed an unreasonable burden on schools and challenged schools' concerns presented above regarding the use of student data. As participants' privacy is this study primary concern, I have not presented the lesson observations and student work findings without school permission.

3.3.5 Conclusion

This chapter delineates how I addressed the research problems by adopting the multiple-site case study. According to the research problems and purpose, I have decided research questions. A comprehensive literature review was conducted by reviewing business and education empirical studies. I have understood the difference between business and education findings and identified the research niches in TEB. I found that the multiple-site case study is suitable for addressing the research niches and research questions. In considering the confidence and trustworthiness of this study, I designed a systematic data collection process and adopted Miles and Huberman's analysis model to understand TEB. Table 3.7 indicates the relationship between research questions, literature review, research niches, data collection, and data analysis. This qualitative study listens to opinions and collects the evidence about TEB from three schools. This study opens up new possibilities for studying TEB in the education sector.

Table 3.7 Links between research questions, literature review, research niches, data collection, and data analysis

Research questions	Literature review	Research niches	Data collection	Data analysis
1. How do teachers and leaders understand and enact TEB and its components?	<ol style="list-style-type: none"> TEB as a process of personal development in which a teacher demonstrates entrepreneurial behavior by creating new teaching and learning strategies at school. TEB refers to teachers who perform innovation, risk-taking, plan and manage a project, show autonomy with a positive attitude, and seek external resources. 	There is an insufficient understanding of the definition of TEB, which is valuable for me to explore this research niche in this study.	School documents; Interviews; Students' work; Lesson observations.	Miles and Huberman's interactive model of analysis Initial stage of analysis in the research site: <ul style="list-style-type: none"> Ensure the confidence and trustworthiness. Second stage of analysis: <ul style="list-style-type: none"> Address research questions through identify the links between patterns and themes.
2. How do they perceive TEB's impact in schools?	There are five impacts of TEB while expanding network for resources is a unique impact in the education sector.	Various meanings of impacts in the business and education contexts: <ol style="list-style-type: none"> Diverse contexts between the business and education sectors. 	School documents; Interviews; Students' work; Lesson observations.	
3. What school conditions enhance or challenge TEB?	There are five school conditions which affect the impacts of TEB while rewarding and market orientation are unique conditions in the business sector.	Insufficient understanding on how conditions interact with TEB: <ol style="list-style-type: none"> Lack of in-depth understanding of various conditions (e.g. Leadership style). Needs of understanding the interactive relationship between schools' conditions and TEB. 	School documents; Interviews; Students' work; Lesson observations.	



Chapter 4 – Case One: Entrepreneurial Teachers as Team Leaders

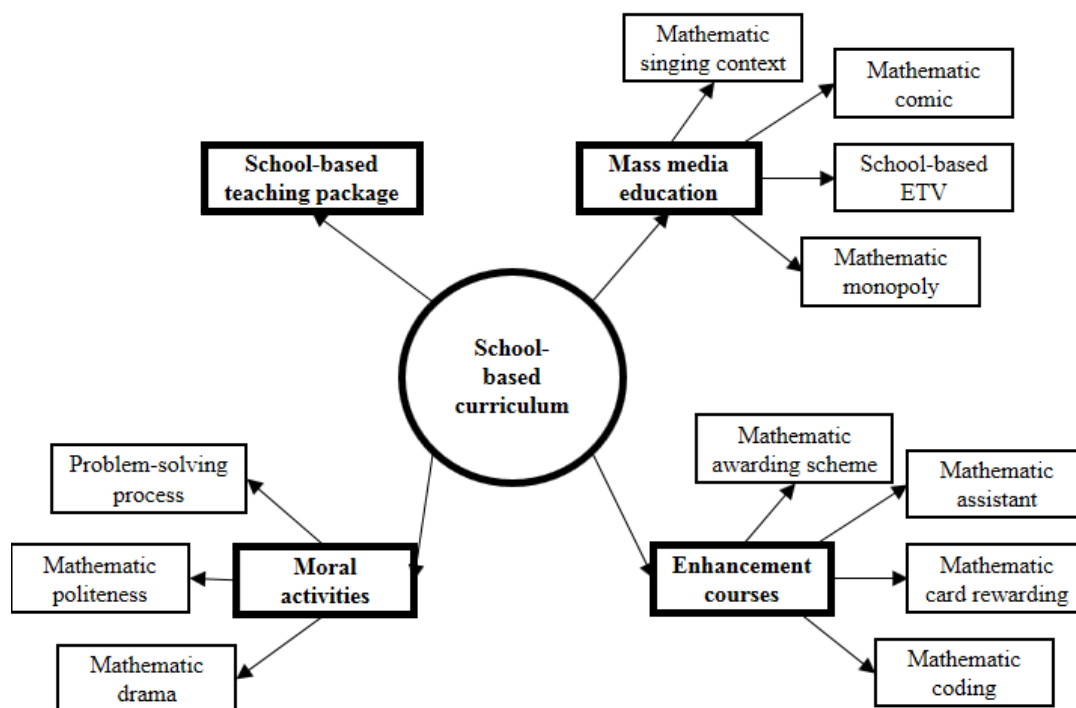
This research consists of three cases, each of which has its own similarities and differences. Therefore, chapters four, five, and six present the findings and analysis of each case separately. Each chapter explains the case background; the story behind the choice of entrepreneurial teachers; the difficulties in actualizing the new curriculum; the reasons for selecting the cases and their context. Then, I analyze the TEB and its impact, together with the conditions for enhancing it in school in order to address the research questions. At the end of each chapter, I also state the significance of TEB in this case and distinguish the special findings from the framework for analysis. Finally, I connect the case to the previous or next chapter for modifying my analysis. This chapter provides the findings of how a mathematics subject coordinator developed an innovative school-based curriculum at a primary school.

4.1 Background Information of Entrepreneurial Teachers

4.1.1 Selection of entrepreneurial teachers

The mathematics subject coordinator is the entrepreneurial teacher, while her team members also perform some entrepreneurial behavior. In 2016, the mathematics subject coordinator was awarded for her outstanding performance in developing the school-based curriculum (Mathematics subject). She aimed at enhancing students' interest in learning mathematics and catering for learning diversity. With regard to her plan, there are four major elements, which consist of a subject-based teaching package, mass-media education, enhancement courses, and moral activities. She developed the school-based curriculum (Mathematics subject) illustrated in Figure 4.1, with her team members. This curriculum is a tailor-made mathematics teaching and learning pedagogy for Primary one to Primary six students during and after the lessons. In this school-based curriculum (Mathematics subject), students had an opportunity to acquire abstract ideas from participating in mathematics activities or by accessing subject-based materials. The mathematics subject coordinator assumed that this curriculum could promote learning by doing and joyful learning for students. Their team believed that cultivating a positive learning environment is the core driver for the student to stimulate their critical thinking with multiple learning activities.

Figure 4.1 School-based curriculum design (Source: Mathematics subject plan)



The judges and I reviewed the awardee's report and assessed their performance with the rubric. Table 4.1 indicates the score of their school-based curriculum. In general, using mass-media education and organizing moral activities were not new pedagogical strategies in Hong Kong. However, the judges appreciated their innovative ideas in developing school-based media education. They contextualized the teaching content to fit the students' needs.

The mathematics subject coordinator did not stick to the traditional practicing strategy for the Territory-wide System Assessment (TSA). Instead, she employed the school-based curriculum to raise students' interest. In the examination orientated education system, her decision was comparatively risky for the school's TSA performance. The judging panel was also impressed by the entrepreneurial teacher's management and the team's autonomy. The school-based curriculum was a labor-intensive project, especially in the teachers' involvement and entrepreneurial teacher's leadership. All subject teachers devoted their time to the curriculum with a sequence of mass media and school-based teaching package production. Therefore, the judging panel marked a high score for the entrepreneurial

teacher.

Table 4.1 TEB score for case one

Judges	Innovation	Risk-taking	The ability to plan and manage a project	Autonomy with a positive attitude	Seeking external resources	Sub-total	Total
I	3	4	4	3	3	17	53
Judges A	3	4	4	4	3	18	
Judges B	3	4	4	4	3	18	

4.1.2 The story of the entrepreneurial teacher

4.1.2.1 Mathematics subject coordinator

Case one is a primary school with a religious background. The school has been established over 50 years. The mathematics subject coordinator has served in this school over 20 years. She has been promoted to the subject coordinator for 15 years. She loves mathematics, but she disappointed that students were not interested in the calculation. The same feedback also found from the subject teachers. Therefore, she decided to figure out the solution of enhancing students' interest with team member starting from the date of being the subject coordinator. They tried many teaching pedagogies at the beginning. One day, a team member was inspired by the educational television program. He convinced the subject coordinator to film a video of teaching mathematics with a song. They invited subject teachers to be the main character in the film. The subject coordinator adopted his suggestion. The feedback was positive from students, who like the teachers' character. Because of the successful experience, the video became the starting point of the school-based curriculum reform. Then, the subject coordinator decided the master plan of developing school-based teaching package and mass media education. They conducted the pilot from primary one first. Through the trial and error basis, the subject coordinator expanded the curriculum with moral education and enhancement course. One vital point is that she made all decisions and developed the school-based curriculum with her core team members. Based on the continuous modification, they finally confined the school-based curriculum for mathematics subject. Now, they have a production system for designing the teaching package and mass media education. Teachers who have an idea or request can approach the core team member to develop material or film for them.



4.1.2.2 Difficulties in actualizing new curriculum

In the process of developing the new curriculum, participants pointed out various difficulties they come across. Some issues were solved by the entrepreneurial teachers, while the principal solved others. In general, they faced six majors' difficulties. First, teachers had a traditional perception of professional teacher image. Therefore, teachers' hesitation in role-playing was that teachers worried about their professional image of being the character of mathematics kingdom. Second, some teachers were resisting to change. They preferred to use the original teaching materials instead of employing new materials. They even argued with entrepreneurial teachers. Third, suggestion overloaded were very common in the subject department. Teachers were willing to voice their concern in developing the curriculum; as a result, there were too many diverse suggestions for entrepreneurial teachers. She needed to make a consensus with teachers. Fourth, the technical problem was a serious issue for video recording and editing. At the beginning stage of developing the curriculum, entrepreneurial teachers could not handle the video with her team member. This technical problem was a sucker punch to curriculum development. Fifth, teachers' high workload was the barrier of developing curriculum. Every teacher has 30 lessons a week that cannot hold an extra meeting for discussing the curriculum. It did affect not only the generation of an idea but also the development of resources. Last, an argument with other subjects was the challenging part for the entrepreneurial teachers. Since their success in creating new curriculum, other subjects complained about entrepreneurial teachers that dominated the teaching assistant resources. These difficulties are authentic examples in developing the new curriculum, which can be divided into two categories. They are technical (technical problem, resisting to change, and teacher overload) and human relationship (Teacher image, suggestion overload, and challenge from other subjects). Starting from section 4.2, I describe the TEB, impact of TEB, and the condition of enhancing TEB. All difficulties were integrated into these parts for illustrating how TEB or principals support to ease the difficulties.

4.1.3 Context of case

Table 4.2 summarizes the information of section 4.1. I have stated the background information and the context of the case. The context of this case was the process of

developing the school-based curriculum because they innovated and activated an idea to establish this curriculum. I interviewed the entrepreneurial teacher and her core team members. They are the key to developing this curriculum. Furthermore, subject teachers and senior management were also involved in the reform. Senior management were the people who authorized and supported the curriculum development. These people are the interviewees in studying this case. Moreover, I reviewed their teaching and learning materials alongside students' work. Subject plans and reports, which were related to the curriculum were reviewed. In the next section, I study the entrepreneurial teacher behavior.

Table 4.2 Background information of case one

	Detail
Entrepreneurial teacher	Mathematics subject coordinator
School	Band two traditional school
Year of award	2016
Reason for award	School-based curriculum (Mathematics subject)
Scores from Judges	53/60
Boundary of case - Events	The process of developing the school-based curriculum
Boundary of case - Interviewees	Senior – Principal and Vice-principal Colleagues – 3 core team members – 3 subject teachers
Boundary of case - Others sources	- Teaching and learning materials - Subject plan and report - Students' work

4.2 Performing TEB as a Team

I discovered that it was not only the mathematics subject coordinator who performed entrepreneurial behavior in developing the school-based curriculum (Mathematics subject), her team members also performed some entrepreneurial behavior at school. Therefore, I explain TEB from the subject coordinator to subject team members one by one. In this section, I describe the entrepreneurial behavior of three major parties, the subject coordinator, core team members, and subject teachers.

4.2.1 Subject coordinator's entrepreneurial behavior

The subject coordinator has served in this school for many years. She was the initiator of developing the school-based curriculum (Mathematics subject). I identified her entrepreneurial behavior from other participants' description. In general, three unique

entrepreneurial behaviors have been recognised in the subject coordinator. To begin with, I employed the framework for analysis to study the TEB of the subject coordinator. However, her TEB is more explicit than this allowed. Therefore, I decided to modify the wording of the framework for analysis to reflect a true and fair view of the subject coordinator's TEB.

4.2.1.1 Coordination competency

Originally, I considered the ability to plan and manage a project to describe the TEB in developing the school-based curriculum. The subject coordinator employs management techniques to achieve her goals in the school-based curriculum, she also coordinates subject teachers to generate, modify and evaluate their innovative ideas. She tried to deal with teacher resistant in employing new pedagogy. While the ability to plan and manage a project emphasizes the managerial skill of entrepreneurial teachers, the findings show that the process of making a consensus decision with subject teachers is the core element in the ability of planning and managing a project. To better represent the meaning of this TEB, I name the coordination competency as an update to the term of the ability to plan and manage a project. This is the foundation of entrepreneurial behavior upon which she leads and develops the curriculum.

Sensible and well-organized

Subject teachers and senior management emphasized that they trust the subject coordinator, because of her well-organized behavior and serious attitude.

‘We believe in our subject coordinator. She is a systematic person and every decision made has been supported by sufficient procedure. She must have a reason for that decision.’ (Subject teacher A)

‘She is not a talkative person... She has a procedure that she does more preparation than you. You will trust her because of her well-organized behavior.’ (Subject teacher C)

‘Because of her systematic working style, she manages and invites colleagues to work with her. She developed what she expects to do with her

leading.’ (Vice Principal)

The subject coordinator is sensible and well-organized, which means she is cogent in managing various tasks and issuing explicit instructions for colleagues. Subject teachers and senior management are impressed by her well-organized working style. They believe in her because she is a reliable leader with a systematic working attitude. Some concrete examples illustrate her systematic and serious working attitude.

‘We have the co-planning session for discussing new ideas... When you have an idea, the subject coordinator will discuss it with you. Then, she will consult core team members and discuss the possibility with all subject members. This is the general practice of developing an idea.’ (Subject teacher B)

‘Our subjects already have a system and we will follow the schedule to complete tasks automatically.’ (Subject teacher C)

‘We cannot be a lazy one. ... We have a strong system to monitor everyone’s performance. If you miss something, others will know it.’ (Subject teacher A)

Her sensible and well-organized practice was also the primary reason behind developing the school-based curriculum. According to subject teachers’ explanations, the subject coordinator constructed a systematic working process to generate new ideas, co-planning, and daily operation. All teachers understand that the subject coordinator is a serious person. Therefore, they automatically follow the well-organized system to complete their tasks. In the systematic review process, they were aware of the lower learning incentive of students. They started to figure out the solution of motivating students to learn mathematics.

Directional Persistence

The subject coordinator needs the persistence to achieve her goal. Persistence means the teacher has fortitude in completing the task and sticks to the focus of implementing new pedagogy (Ryans, 2010).

‘You know, we have an outstanding subject coordinator. She is a coordinator instead of showing off. She stays back and controls everything. ...She has enthusiasm for generating new ideas with a clear focus. She mentors all colleagues with clear direction.’ (Principal)

The subject coordinator has the authority to select team members at the beginning of the semester. Her directional persistence is demonstrated in the process of selecting team members and deciding the role of subject teacher. She understands that the new curriculum is an intensive workload for teachers. Therefore, she needs capable teachers to work with her and follow her direction. To avoid the teacher resistance, she recruits all subject teachers on her own to ensure all members stick to her goals and meet her performance standards. She explains her expectations to teachers at the recruitment stage.

Because the subject coordinator selected all the teachers herself, she understands her colleagues’ capacity and attributes. She allocates talented subject teachers to participate in developing the school-based curriculum effectively. For instance, she was responsible for the subject matter, while other colleagues were responsible for filming, production, script design, and acting, etc. All participants agreed that she had an idea and allocated colleagues to the right positions.

‘They have a clear division of labor already. ... It’s just like a professional production, everyone is in the right position.’ (Subject teacher C)

‘We think about the content of the drama. ...The rest of it goes to the team. They will identify our needs and get it done.’ (Subject teacher B)

‘We are the production team. Colleagues can join anytime. They are responsible for generating the ideas.’ (Core member C)

‘Core members C and D are actors, while the subject coordinator and I are backstage. We are responsible for fixing the problems.’ (Core member A)

All subject teachers have responsibilities and opportunities to contribute to developing the

school-based curriculum. Teachers who perform satisfactorily and aligned with her goals can stay in the department. Conversely, poorly performing teachers are required to leave the mathematics department. This implies that she has persistence in ensuring colleagues performances aid in achieving her goal.

‘It is impossible for everyone to be a member. If your performance is poor, you cannot stay.’ (Subject teacher B)

‘We pick the best to perform our tasks and goals.’ (Subject teacher A)

Directional persistence was the key to the subject coordinator successfully pursuing the school-based curriculum. With coherent guidance, all teachers have a clear direction to follow and perform their duties to develop the curriculum.

Consensus among core team members

Although the subject coordinator shows directional persistence, her direction is the consensus among her core team members. In deciding the direction of developing a school-based curriculum, the subject coordinator adopts a collective decision-making strategy to manage the mathematics team. Collective decision making with core team members means that the entrepreneurial teacher can freely discuss the new school-based curriculum with a core team member. Within the mathematics department, there is a regular core team meeting. The subject coordinator makes important decisions and generates new ideas for the school-based curriculum with the core team members. These core team members are experts in specific areas, such as writing lyrics, script, drama, etc. Their comments are valuable sources in the decision making and brainstorming process. The subject coordinator and core team members find that collective decision making is a means of generating and modifying innovative ideas. Therefore, they enjoy the process of collective decision making in their regular meetings.

‘Four of us have a regular meeting twice a week. We will think about how to develop our subject.’ (Subject coordinator)

‘You know that it is a horrible thing to teach alone... We found our partners

(Core team members) in making the decisions.’ (Core member C)

‘My strengths are not like theirs. I need their contribution to make things happen. Therefore, we are a team in doing things. We think together.’ (Core member C)

Because the collective decision making becomes a formalized operation in the subject department, subject teachers also realize that the core team members are the consultants for the subject coordinator to make every important decision. Based on their suggestions, the subject coordinator provides constructive instructions for subject teachers to complete the task. The findings of subject teachers indicate that regular meetings with core team members are a typical collective decision-making process.

‘That’s right. I found or heard that many times. When there is something happening, she will discuss it with core members first. ... They will come up with an idea from the meeting.’ (Subject teacher B)

Most importantly, the subject coordinator has an opened-minded belief that teachers’ comments are important for making wise decisions when developing the subject-based teaching and learning curriculum and materials. When there are some technical or conceptual problems, she will not stick rigidly to former decisions but may adjust strategies to achieve her goal without changing the purpose of the task. This demonstrates higher flexibility in making every decision after consulting core members’ opinions.

‘We are able to voice our concerns that something may not work. ... After we try it out, they will take our advice to revise their decision. We want to make things better.’ (Subject teacher A)

Pilot sampling

The subject coordinator has a habit of conducting pilot sampling of every new project herself before she promotes it to all teachers. Pilot sampling is a seed project at school and is treated as an example for colleagues to follow. Pilot sampling is a crucial strategy for the

subject coordinator to test the effectiveness of teachers' innovative ideas.

'At the beginning, it is a small scale project, like ETV. Then, they come up with a booklet, character and so one. ... I would say, they got an idea ... Then, they work together and turn it into a curriculum.' (Vice Principal)

'It's just an activity for fixing a specific problem. ... It works, so we keep on and it becomes a teaching package.' (Core member C)

In reality, the school-based curriculum was not originally designed for all students. Teachers stated that the school-based curriculum was started with a pilot video. They aimed at addressing students' learning difficulties with an attractive video. With the successful experience of a pilot video, the subject coordinator tried more new strategies and consolidated them into a programme. Teachers also found that the subject coordinator has already formed the habit of constructing a seed project for developing a school-based curriculum. When the feedback of a seed project was positive, they would develop a line of materials or curriculum by considering the successful experience.

Self-reflection

During the development of the new school-based curriculum, all mathematics teachers needed some space for self-reflection. This process helps teachers conceptualize and understand what they have learned from implementing new pedagogy. Subject teachers emphasized the importance of reflecting upon their teaching and learning. In reality, they found that the subject coordinator also uses self-reflection in making a decision. When facing difficulties, the subject coordinator consulted core team members and subject teachers' opinion first. She would then consider all possibilities and reflect independently. Teachers may get a response from her on another day. This decision-making process indicated that the subject coordinator employed the practice of self-reflection.

'She is a mathematics expert. She is not a traditional person. If some tasks are not necessary then she will skip them. When there is any difficulty or question from us and she needs some time to think. She will say "Give me a second, I need to think." Next day, she will have an idea.' (Subject teacher B)



To sum up, the subject coordinator performs the coordinating competency in making censuses decisions as well as planning and managing difficulties. The subject coordinator is a well-organized person with a serious attitude, which is essential for her to obtain her goals. Her persistent directional character in achieving her personal goals helps her to concentrate on her goals and monitor the working process by recruiting capable teachers. Moreover, she has the practice of starting with a small step. One thing which is pivotal is that she cherishes teachers' advice to construct a seed project. Based on successful experience, she led her team to complete the stupendous feat of developing a school-based curriculum. These are the subject coordinators' entrepreneurial behaviors in demonstrating coordination competency.

4.2.1.2 Innovation

In general, innovation means that the entrepreneurial teacher generates and performs new ideas for doing old or new tasks. The subject coordinator generates innovative ideas for the school-based curriculum with core team members.

The catalyst behind being an innovative teacher is that the subject coordinator and teachers recognised students' learning difficulties. In the mathematics subject, most teachers have over five years of teaching experiences in school. They are experienced in mastering the curriculum and can adopt the traditional teaching approach to teach smoothly. However, the subject coordinator and teachers found that there were some disadvantages of employing traditional teaching pedagogy with a textbook. To solve the problem of students' learning diversity, they agreed to develop an innovative teaching approach together. This is a typical example of inventing new ways of doing old tasks.

‘Children are quite strange sometimes. They didn't know how to use a ruler... To solve this problem, we thought about how to guide them in using a ruler. We discussed it and explored the possibility of using a song. That's a new way to teach the same skill.’ (Subject coordinator)

‘We found that the children are not that interested in the activities. In our experience, no one will listen to the briefing session. ... To enhance their

interest, we thought about the possibility of using video.’ (Core member C)

‘Once we have an idea... they (Core members) will discuss it with us. All of us work together to generate the idea and produce all materials.’ (Subject teacher A)

In order to solve problems, the subject coordinator and subject teachers are creative in generating innovative ideas. They explained that they are interested in popular social media, such as Facebook, Instagram, etc. Therefore, they stay closer to the fashionable and trendy things for children. When they recognize any attractive materials from social media, they explore the possibility of integrating them into teaching and learning. For example, there was a hit song for children in 2015. Teachers decided to rewrite the lyric as a mathematic equation. The song gained positive feedback from students, and the successful experience motivated teachers to write more songs for students. They now have a set of mathematics song materials for primary one to primary six students.

‘We always pay attention to the fashion and teenagers’ culture. We view things from the kids’ perspective. I want to know what they think. If some song is viral, we will rewrite the lyrics.’ (Core member A)

‘Just like catching Chow Yun Fat. Last year, many people wanted to ‘catch’ Chow in photos. Therefore, we designed activities around ‘catching the mathematic master and king.’ (Core member C)

‘They like playing a card game. I have no idea what it is. So we designed some cards for them with mathematics elements. They like that.’ (Core member C)

The process of generating ideas and integrating them into teaching is a typical example to illustrate how all subject teachers facilitate students’ learning with innovation. They are not only creative in the idea but are also able to convert the idea into reality. The subject coordinator and subject teachers have translated various innovative ideas into plenty of teaching packages, videos, and stimulating activities for students. The high number of innovative teaching and learning materials in the school-based curriculum indicates that

the subject coordinator and subject teachers are innovative people.

4.2.1.3 Risk-taking

With regard to risk-taking, the subject coordinator and core team members treat recognizing a problem as an opportunity to figure out a solution. Risk-taking means an entrepreneurial teacher seizes opportunities by being more adaptable to working beyond the existing paradigm. Risk-taking was also a motive for the subject coordinator to achieve the school-based curriculum. As the previous section mentioned, the subject coordinator found many difficulties in catering to students' learning diversity and mobilizing students' learning. Although they had some innovative ideas to solve the problems, she predicted and considered the potential risk in adopting the school-based curriculum. The most important risk is the teacher professional image and the effectiveness of the new curriculum.

‘Honestly, we worry about that... what if we make a mistake that affects students’ academic performance? It’s the worse situation.’ (Subject coordinator)

‘We don’t know what the results will be. Foreseeing is the worst situation in producing.’ (Core member B)

However, her attitude towards risk strengthened her will to try new teaching and learning pedagogy as part of a school-based curriculum. She thought that the potential risk was a chance for teachers to try to cater to students’ learning. She believed that teachers should act once they have identified an opportunity with risk.

‘The method we use may work for this year, but it can be outdated in another year. We need to uphold our standards and see the opportunities to take action.’ (Core member A)

‘I guess it is about the insight of foreseeing opportunity. We foresee P1 and P2 students’ learning difficulties and understand their strengths and weaknesses. Then we need to do something in P3.’ (Core member B)

There are two concrete examples demonstrating their risk-taking behavior. The first example is the development of a subject-based teaching package. The subject coordinator found that some students were not thriving under the traditional pedagogy. Therefore, she decided to develop a new teaching approach instead of employing the traditional teaching aids and textbooks. She did not consider giving up the traditional and practical pedagogy to be a risk but saw it as an opportunity to change.

‘We truly want to tailor-make some materials for our students. Based on their ability, we came up with some ideas. ... We want to take this chance to change.’ (Subject coordinator)

‘Some colleagues are familiar with the topic already. We understand the curriculum clearly and teach all forms. We foresee students’ learning difficulties and use some strategies to cater to their needs. ... We see it as an opportunity to solve problems.’ (Subject teacher A)

The second example is the integration of subject knowledge into moral and civic education. She realized that there was a lack of moral education in using the money. Therefore, she treated it as a chance for integrated mathematics subject knowledge to nurture students’ positive values in moral and civic education.

‘The major concern of schools is social justice. That’s so difficult to explain in the lesson. We needed some extra time to teach this, so we came up with an idea for teaching money honestly with mathematics.’ (Core member C)

‘We don’t know what will happen. It is a chance, so we work it out.’ (Core member A)

The above examples show that risk-taking encouraged her to take the initiative in trying a new teaching pedagogy. Then, the successful experience became the foundation for developing the school-based curriculum.

4.2.1.4 Autonomy-enthusiasm

Referring to the framework for analysis, I originally employed the phrase ‘autonomy with a positive attitude’ to analyse the findings. However, I realized that it is the subject coordinator's enthusiasm which mobilizes her to improve teaching and learning rather than a positive attitude. All interviewed teachers are autonomous in performing and pursuing their education goals. They are self-sacrificing in developing teaching and learning materials. Therefore, I have changed the wording from autonomy with a positive attitude to autonomy-enthusiasm.

The subject coordinator and all interviewed subject teachers display a characteristic of autonomy-enthusiasm. Autonomy-enthusiasm means that the entrepreneurial teacher takes personal satisfaction in grasping the initiative to complete an assigned task or personal goals persistently.

Autonomy

The subject coordinator and subject teachers demonstrated autonomy in developing the school-based curriculum. Autonomy means that entrepreneurial teachers take the initiative to complete the assigned task or personal goals. Because they are motivated by their education goal, the subject coordinator and subject teachers adopt new teaching and learning pedagogy at school. Their education goal can be defined as a moral purpose in education (Fullan, 2009). They design various teaching materials to arouse students learning interests because they want to construct a positive learning environment for students.

‘We are very lucky that our teachers have a profound desire to serve in teaching. They have the heart to try something new. If it is good for students, they will try.’ (Principal)

‘We need to make sure that they understand the concept. I worry about seeing an unhappy face in my lesson. I want to bring something interesting to them. Let them taste the fun of mathematics. This is my direction. This is something worthy of me.’ (Core member C)

‘Mathematics is quite boring. It can be very boring. If they learn happy, that is the joy of learning. I think it is important to make sure they are happy. Then, they will learn.’ (Subject teacher A)

They produced innovative subject-based teaching and learning materials for students without taking any credit. They developed multi-media, mathematics souvenirs, stimulation games, teaching materials, and workshops, etc. There were many innovative teaching and learning materials and activities, such as measuring the dimension of school facilities using an ICT device for solving mathematics problems, and subject-based videos, etc. They emphasized that they just enthused in the process of developing subject-based materials for the student. Teachers thought that the duty of being a teacher was to integrate pleasure into mathematics with innovative teaching. It is not unusual for them to earn compliments.

‘They are very active and creative. Many ideas ... They want to have a role to play. So, we simply take a camera and record a video... The process is good. It’s fun, we enjoy it so much.’ (Core member C)

‘They are very funny. We have many ideas for designing materials. Every one of us will work it out once we have the idea. ... Of course, we will discuss.’ (Subject teacher B)

‘You can see if they are bored with your lesson, it is usual for me to entertain my students to release their stress -it’s worth it.’ (Core member C)

‘I don’t mind that colleagues take all credit from us. I found that it is fun for students and colleagues. You have to enjoy your teaching. Otherwise, you may suffer from burnout. Marking and teaching... Waste your time. So, make it fun.’ (Subject coordinator)

The subject coordinator and her subject teachers have a vision of nurturing students’ positive learning attitude in mathematics, which automatically drew them as a team to contribute to developing the curriculum.

Self-sacrificing

I recognized one characteristic of autonomy-enthusiasm which is not mentioned in empirical studies – self-sacrifice. Self-sacrifice means that entrepreneurial teachers spent extra time and personal resources to perform the new pedagogy. Many teachers stated that they were self-sacrificing in developing the school-based curriculum in term of resources and time. For example, at the beginning of developing the school-based curriculum, all props and recording equipment were provided by the teacher, because they knew that the subject department did have not enough resource funding for the ad-hoc idea.

‘We all paid for our own props ... The Principal buys his own props too.’ (Subject coordinator)

‘The printed materials were made by me.’ (Core member C)

‘I bought the bow tie myself.’ (Core member A)

In addition, teachers also spent extra time to generate an innovative idea or modified subject-based teaching materials. For instance, the subject coordinator spent much time studying pedagogical reference books for developing teaching materials. Core team members composed the lyrics at midnight. Subject teachers recorded videos with colleagues after school hours, even in the staff development day. All of them developed the subject-based teaching package by using their own time.

‘I wrote the lyrics at midnight. Once I have a new idea, I will work it out.’
(Core member A)

‘She read a lot. It’s about theory, teaching... She spent the whole summer reading our reports and memorizing what has been done. She also discusses with experts to improve teaching and learning.’ (Subject teacher B)

‘She is very hardworking... she is back in school every Saturday.’ (Subject teacher A)

The above self-sacrificing actions indicate teacher enthusiasm in developing new teaching and learning materials. Therefore, I decided to use ‘enthusiasm’ to represent their self-

sacrificing spirit.

4.2.1.5 Strategic resources

Originally, the framework for analysis emphasizes seeking external resources as one of the TEB. However, the findings of case one indicate that an entrepreneurial teacher is not only looking for external resources, she seeks internal resources as well. She has a strategy in her mind to gather resources and integrate them into developing the school-based curriculum. Therefore, I decided to reframe the term seeking external resources to ‘strategic resources’ as one of the subject coordinator’s entrepreneurial behaviors. Strategic resources mean that entrepreneurial teachers tend to expand the network for gathering internal and external resources. These resources can be in terms of internal expertise, financial sources and teaching resources inside and outside of school.

The subject coordinator expands networks for gathering resources inside schools. In this case, she looked for internal expertise (IT assistant) to deal with difficulties in implementing the school-based curriculum.

‘At the beginning, I spent so much time on the production ... We are so lucky that we got TA. He has many ideas and is good at drawing. We find him and seek his assistance. ... He is a good assistant, he makes things happen. Once we have an idea, he will handle all technical stuff for us.’
(Core member C)

‘We appreciate what he did for us. He is a caring person that will work it out on his own. He also gives you some constructive advice sometimes. They found the right person to handle the technical things.’ (Subject teacher B)

When the teacher tried to fix the technical problems of producing the video for students, they found that it was very time-consuming. This is the critical challenge for teachers as a technical difficulties. To enhance the effectiveness of adopting a new pedagogy, the subject coordinator actively sought expert assistance. She realized that the teaching assistant had expertise in producing multi-media. In the beginning, she consulted the teaching assistant

in producing all materials. With the support of the teaching assistant, she understood the importance of having a technical expert for developing subject-based material. She invited this teaching assistant to join their team. Indeed, the teaching assistant was the internal resource for them to deal with their technical problems.

However, the sustainability of the internal expertise was dependent upon the financial resources. The contract of the teaching assistant is reliant on EDB funding.

‘We apply for the QEF to ensure the job stability of our teaching assistant. We are working on it now. It is not that easy, especially handling the application requirements.’ (Subject coordinator)

To ensure the job security of the teaching assistant, the subject coordinator needed to secure the financial resources. Therefore, she sought funding to employ an outstanding teaching assistant in their school, to help subject teachers when handling technical problems. Her purpose in seeking this resource was to reduce teacher workload and complete the task efficiently.

‘She has some friends from other schools. When we think about how to teach a specific topic, she will collect other schools’ material for us. ... We will tailor-make subject-based materials after reviewing other schools’ resources.’ (Subject teacher B)

Furthermore, the subject coordinator realized the difficulties of teaching special topics at schools. To enhance and facilitate teachers’ teaching, she expanded her network of external resources to other schools and gathered other schools’ materials for her subject teachers. Teachers reviewed other schools’ materials and integrated them into their school-based curriculum teaching materials. Both external and internal resources are going to serve the same purpose - that of facilitating teachers to teach effectively. The above strategies assisted teachers to perform their duties in the school-based curriculum. They gained ideas from the other schools and integrated them into their curriculum.



4.2.1.6 New items - Humility-Confidence

Humility-Confidence is a new entrepreneurial behavior in this research. The meaning of Humility-Confidence is that an entrepreneurial teacher is confident in their professional judgment while maintaining a humble manner. All participants had a consensus that the subject coordinator is confident in managing her team with a humble manner.

‘I guess she is a good leader. She never wants to highlight what she has been doing. She does things right.’ (Subject teacher C)

‘She is not an arrogant person, she has confidence. ... She never shows off what she has got. That’s the truth.’ (Subject teacher B)

‘If you say she is humble ... I partly agree. She is confident. Somehow she is not fully humble because she needs to defend what she believes.’ (Subject teacher A)

According to all interviewees’ description, the subject coordinator has high confidence in her decision making. Whenever others challenge her decision, she will defend subject collective decisions with humility.

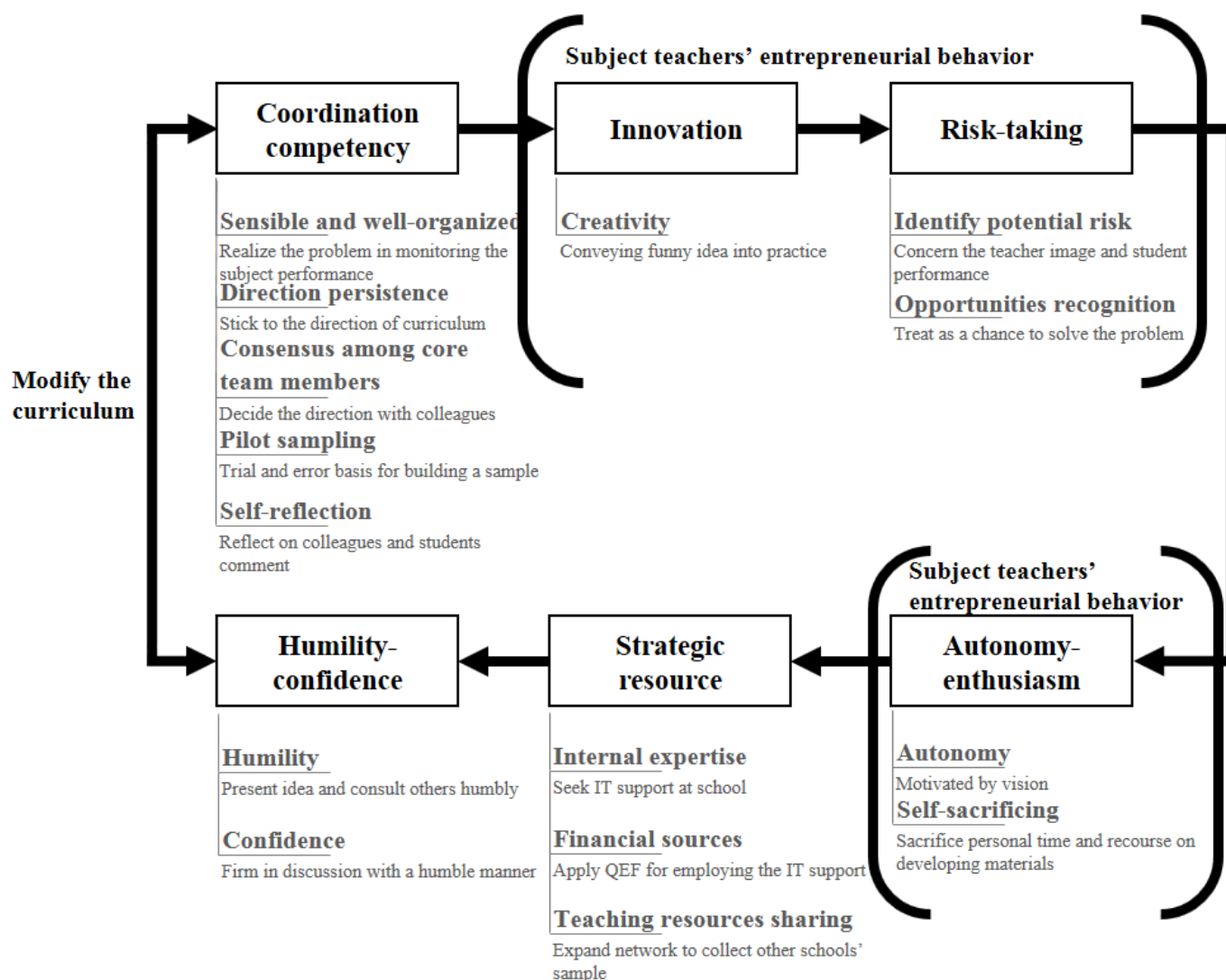
As the leader of the subject department, she considered subject teachers’ feelings in voicing their concerns and performing their duties. Even when she has made up her mind, she prefers to present her request humbly. This character trait builds a harmonious environment in the department. Teachers were willing to voice their concerns, which was beneficial to the curriculum modification.

4.2.2 Summary for performing entrepreneurial behavior as a team

To conclude, we identified six TEB in this case. Some TEB have been renamed as coordination competency, autonomy-enthusiasm, and strategic resources, because of the new findings in the case. To clarify the concepts of these TEB, Figure 4.2 illustrates how entrepreneurial teachers performed the entrepreneurial behavior in developing the school-based curriculum. The subject coordinator located the common problems in the mathematics subject through a sensible and well-organized system. She discussed the

solution with the core members of the subject department. With a risk-taking spirit, they tried to run a pilot filming (innovative idea) in the primary one curriculum. The innovative teaching and learning pedagogy strengthened their confidence in developing the school-based curriculum. They took the initiative to gather resources and invite colleagues to contribute to the curriculum. In the process of developing the curriculum, the subject coordinator stayed back humbly to listen to teachers' advice. She reflected and modified the curriculum with teachers. Obviously, her strong vision and humble manner encourage teachers to take the initiative in generating more innovative ideas. As a result, they modified all pilot projects and enclosed them in a school-based curriculum. In the process of developing the school-based curriculum, core team members and subject teachers also performed some entrepreneurial behavior, such as innovation, risk-taking, and autonomy-enthusiasm.

Figure 4.2 Conceptual description of TEB



4.3 Impact of TEB

In the framework for analysis, the impact of TEB perceived by teachers was simply defined in five items. However, I recognized during the interviews with the participants that the impacts of TEB can be classified as direct impacts and indirect impacts. Direct impacts occur when the entrepreneurial teacher develop the curriculum with mathematics teachers. Indirect impacts occur when students, other subject departments, and schools experience some changes following on from the success of the school-based curriculum (Mathematics subject). The indirect impact was not the direct result of TEB that there are many possible factors to enhance students learning performance, such as subject teachers, parents, school culture, etc. However, to a certain extent, student learning performance and school banding

may be a ‘by-product’ of the impact of TEB. In this section, I mainly indicate the impact, which may relate to TEB, on different parties by quoting their interviews and school documents.

4.3.1 Cultivating a positive atmosphere for students learning mathematics

According to the framework for analysis, enhancing the general performance is one of the impacts of TEB. In case one, the goal of adopting the school-based curriculum provides a more specific explanation of the term of general performance from a students’ learning perspective. This is the indirect impact of TEB through constructing the new curriculum to students.

The goal of adopting the school-based curriculum is to cultivate a positive learning atmosphere for students of mathematics. Mathematics teachers are devoted to actualizing this purpose through the school-based curriculum. Subject teachers perceive that their curriculum improves students’ engagement and enhances academic performance. According to the development process of the school-based curriculum, this part is going to analyze how the entrepreneurial teacher’s school-based curriculum influences students’ engagement and academic performance.

4.3.1.1 Enhancing engagement in mathematic learning

The primary purpose for the entrepreneurial teacher in constructing a school-based curriculum for students was to create a condition for strengthening students’ engagement in mathematics. Before the implementation of the new pedagogy, teacher felt that students lacked motivation in mathematics. In the co-planning session, all teachers agreed that this problem should be addressed immediately. They decided to develop subject-based materials to encourage students’ engagement, which means that students are actively willing to learn in or after lessons.

‘Our department has a co-planning meeting for every form. We identify the difficult and core part of the topic for each form. We take action to wrestle with the difficult part and try to handle it in a non-boring manner. Not just

talk about how to solve problems.’ (Subject teacher B)

To ensure students engagement in solving mathematic calculations for complicated tasks, teachers thought that the teacher-student relationship was a crucial element which encouraged students learning. They decided formalizing teachers’ characters as masters of mathematics was an attractive and funny strategy to foster a positive relationship with students and enhance their engagement. They reasoned that teachers, who demonstrated the determination to solve mathematics difficulties, may attract students to imitate their enthusiasm in solving mathematics problems. By forming a positive image of the master of mathematics, the teacher found that students were more attentive in and after the lesson.

‘We need to do something tailor-made... at least... It must be something they like. If you don't like it, tailor-made is meaningless. We have mathematics god and mathematic king in our school. They play and teach students funny mathematics concepts... They are the stars. When students learn from them, it is easy to understand the concept.’ (Core member B)

‘Students love our teachers’ characters so much. We designed a card for the character which students collect and use for learning mathematics. ...it not only becomes a souvenir, but our character also has an animation. Students love and watch the film regularly.’ (Core member C)

Because of the positive feedback of the teachers’ character, the entrepreneurial teacher realized the benefit of arousing students’ engagement in learning mathematics. They had another innovative idea that there was an opportunity for students to design the character of a mathematics kingdom for mathematics teachers. Subject teachers believed that students’ participation in developing teaching and learning materials could foster a sense of belonging. Students would be more attentive to what the character taught in the materials.

‘Students were so attentive in all mathematics activities because that’s their design. Every student has one vote for nominating the next characters... In our materials, like the booklet, you can find their character. They feel like a

family. They expect their teacher will be part of mathematics... They engage in learning. They take note and draw the concept and character. It becomes part of their lives.’ (Core member C)

According to the subject teachers’ feedback, the purpose of cultivating a positive learning atmosphere is successfully met. Students cultivate a sense of belonging through the mathematics characters. Now, they call subject teachers ‘master of mathematics’, ‘god of mathematics’ and ‘mathematics lady’ etc. They are attentive in the mathematics lessons because they like the characters of ‘Mathematics Kingdom.’ Furthermore, students also engage in handling challenging mathematics tasks after school. When they meet any mathematics teacher, they ask them mathematics questions or look for assistance in handling mathematics difficulties. The positive mathematics learning atmosphere is not only found in the lesson but also exists after the lesson. Students participated in the mathematics activities in recess, which is about solving the code of calculation. Teachers expressed their opinion that the impact of the entrepreneurial teacher curriculum is to enhance students’ engagement with and participation in mathematics activities.

‘The award for students is the mathematics character card. Students take it seriously and they will actively ask and answer questions in the lesson.’
(Core member B)

‘There is a ‘Fai Chun’ for the students. Some mathematics concepts are at the back of ‘Fai Chun.’ Students were the enthusiastic in joining our activities to answer these questions.’ (Core member A)

‘They are devoted to mathematics. When I go out with students for the physical education lesson, they ask me mathematical questions. ... They emphasize the mathematics god already assigned some task to them. They will handle it.’ (Subject teacher B)

4.3.1.2 Enhancing mathematic academic performance

Teachers thought that the entrepreneurial teacher’s curriculum also has a positive impact on students’ academic performance. The strategy of cultivating positive mathematics

learning promotes students' learning performance in mathematics. When students engage in mathematics activities, they have opportunities to practice mathematical logic. Subject teachers stated that enhanced students' engagement improved academic mathematics performance.

'Our students' memorize all teachers' characters in the film 'Mathematics God Train.' They review it and review it. ... When they find any difficulties in solving the mathematics problem, we remind them of the film. Then, they finally grasp the concept and solve the problem on their own. ... It's a skill. You memorize our train. Then, you figure the way of deduction and add in number.' (Core member C)

'Their strategies in solving mathematics problems changed. Of course, they have difficulties in solving them. In the past, they may give up or seek help. They are now committed to solving them on their own. They also try to see the possibility of using other methods. Most likely, they know the way out.' (Core member A)

With the successful experience of cultivating a positive learning atmosphere, core team members and the subject coordinator integrated teachers' characters into subject-based teaching materials, such as supplementary notes and exercises, etc. These materials demonstrate how to solve difficult mathematics questions and grasp the complicated concepts. When teachers realized any common mistakes made by students, they developed materials with teachers' characters to explain the concept, such as mathematics songs. Teachers found that students' improvement showed in the school's assessment and the Territory-wide System Assessment (TSA). Since the mathematics department introduced the school-based curriculum with teachers' characters, to cater for students learning difficulties, the performance of TSA has improved steadily at a high level.

'The materials, we developed, can be revision materials for students. P6 students can review them at any time when they find any difficulties.' (Core member C)

‘We are like a doctor. We cure the disease with relevant medicine. We check their problems and strengthen their knowledge at the same time. The purpose is about fostering long-term memories. Our school is not located in a favorable location. Some students are comparatively weak. By developing these materials, students acquire the skills of how to solve the difficulties in examination and assessment. We keep on doing that. It is good for them... Our TSA results are excellent. We are on the high level.’ (Subject teacher A)

‘Other subjects are jealous of our excellent performance. We have great improvement with the new pedagogy.’ (Subject teacher B)

Mathematics teachers believe that students foster a positive learning attitude to facing mathematics challenges, which enhances their academic performance, because of the condition created by the entrepreneurial teacher. She worked with subject teachers to create favorable learning conditions to study mathematics. In their point of view, both students’ engagement and academic performance go hand-in-hand with cultivating a positive mathematics learning atmosphere and mathematics teachers’ contributions.

4.3.2 Enhancing the mathematics department teachers’ performance

According to teachers’ feedback, they stated they have an enhancement in the general teaching performance. The subject coordinator has a direct influence on the department teachers’ performance. As teachers said, the team works efficiently. Every teacher believes in the subject coordinator’s leadership and trusts each other to complete various tasks. They foster a coherent subject in which teachers are committed to adopting innovative pedagogical strategies and facilitating students learning.

4.3.2.1 Enhancing working efficiency

The subject coordinator enhances the working efficiency of the mathematics department, this means that colleagues are responsible for greater efficiency in performing tasks. Subject coordinator constructed a systematic operation system for the department to handle daily tasks, co-planning and generating new ideas, etc. Subject teachers reported that they admire her ability in planning and managing the department because she always handles

every task with clear guidelines and processes. This motivates subject teachers to concentrate on completing their tasks in line with her systematic process. They meet all the deadlines and the standards she sets.

‘Our subject is very systematic. There are various deadlines you need to meet. Every one of us fulfills our duty... No need to be reminded by others. We remind ourselves. ... Don’t worry, if you forget... someone will remind you.’
(Subject teacher B)

4.3.2.2 Fostering trust for department coherence

Fostering trust is a new finding in this study. The subject coordinator fosters trust with core team members, subject teachers, and senior management. The subject coordinators’ reliable performance encourages others to believe in working with her and the mathematics subject teachers, while she enhances the working efficiency of the subject department. Because of the systematic working process, she seldom makes a mistake and achieves all initiated tasks on schedule. Subject teachers and senior management found that she is a reliable leader. They are willing to work with her and core team members because they trust them.

‘You can see that all of us are hardworking. No one can be the lazy one. ... She is the reason. She remembers everything. For example, every subject has a memo for the special function. We need to report it. You won’t forget it because she won’t forget. We trust her. She never ... nearly never forgets things. We want to work with her’ (Subject teacher A)

‘In fact, we trust them. They are the experts. Just like core member, D. He has expertise. He always finds much evidence to support. There is no reason not to trust them. ... They are reliable.’ (Vice Principal)

Furthermore, subject teachers emphasized that the other reason for trusting the subject coordinator is the collective decision-making process. In making all decisions for the curriculum, the subject coordinator and core members listen to subject teachers’ advice. Most of their opinions with a reasonable rationale would be integrated into the decision. If

their suggestions were turned down by the subject coordinator or core team members, they would explain the reasons for rejection. Most subject teachers felt respected and accepted their final decision because they think that the reason for rejection must go through a systematic process of considering all factors. There is apparent trust in the decision-making process.

‘She listens to everyone. It is fair that everyone can suggest ideas or advice in the decision-making process. She is a reasonable and fair person.’ (Subject teacher B)

‘They will remind you what the problems are. It is not a mistake. Some people may think that is a challenge, but we won’t go that way. We agree and accept gratefully.’ (Subject teacher A)

The trustworthy relationship between the subject coordinator and core team members promotes coherence throughout the development of the school-based curriculum. The subject coordinator invited all subject teachers to join in with and contribute to developing the school-based curriculum from the generation of ideas onwards. As some teachers said, because of the subject coordinators’ reliable performance, most subject teachers decided to accept her invitation. They discovered a sense of ownership in developing and executing the curriculum because they experienced the process of being the developer of subject-based materials. Subject teachers are fond of being a team member in the mathematics department, and the trusting relationship promotes a sense of belonging to the department.

‘In developing the drama, we are not like actors with a script. Most scripts are developed by our own teachers. ... We offer direction to them. They have many new ideas... They are outstanding. They have so many ideas for us.’ (Subject coordinator)

‘My role changed. I have a character now and feel proud of it. Students say that I am Mathematics Lady. Even though I teach Chinese; they still want to ask me mathematics questions. I feel like ... mathematics department is part of my life. It forces me to be a better teacher.’ (Subject teacher A)

Furthermore, the trustworthy relationship might also facilitates teachers in bringing up innovative teaching ideas, which offers an opportunity to enhance the coherence in the subject department.

‘Whenever we have an idea, such as e-learning, video or materials, they talk with us and figure out how it works.’ (Subject teacher A)

‘They are not looking for followers. They listen to your ideas and we come up with solutions together. We work closely together while we are developing materials.’ (Subject teacher B)

As teachers stated, the subject coordinator and core team members are keen to assist teachers who are enthusiastic about trying new pedagogy or generating innovative ideas and achieving those ideas. In the process of developing a new curriculum, subject teachers stated that they believe in the subject coordinator and core team members with trust. They were the facilitators who provided guidance and worked closely with subject teachers. The coherent relationship is formed through this working practice - they trust each other and foster a sense of ownership in developing new materials.

The Principal also observed that a trustworthy relationship is well established in the subject department. There has been no turnover of mathematics teachers in the past few years. In fact, the number of mathematics department teachers is increasing. This is evidence of departmental coherence.

‘I am happy to say... their team is growing. No one leaves. They do the thing right. When the time is right, they do something to make them stronger. They work together with a clear division of labor.’ (Principal)

4.3.2.3 Risk taking with job satisfaction

Subject teachers are now taking the risk of adopting the school-based curriculum with high job satisfaction. This finding echoes the framework for analysis that taking the risk with job satisfaction means that experiencing the benefit of new pedagogy enhances teachers’

job satisfaction and cultivates confidence in confronting risk. At the beginning of developing a school-based curriculum, the subject coordinator hesitated because she worried about the effectiveness of their innovative teaching strategies. She foresaw the potential risk of adopting the new curriculum.

‘We worried about the result. It may affect students’ academic performance if we make any mistake.’ (Core member A)

‘It is about my image. I was concerned about what parents and students were thinking. Being a teacher character might change their view of me.’ (Subject teacher B)

The successful experience of the subject coordinator and core members motivated other mathematics teachers to adapt and get involved in the new curriculum. Subject teachers worked together and experienced positive feedback from students. Subject teachers stated that this successful experience enhanced teachers’ confidence to generate more innovative teaching strategies. Even though some ideas, which might facilitate students’ learning were potentially risky, they would propose them to the subject coordinator and try to accomplish them.

‘That’s true. We got it done successfully. This is the major reason why we tried the other new material in the second semester. We do it in the same way with a different topic. It is very smooth. This is very encouraging. Then, we decided to do more and try more things.’ (Core teacher C)

‘I found that students like it. So, I kept on playing the character and turned it into animation. That’s unexpected. The feedback is better than the previous version. Our team makes it happen.’ (Core teacher A)

‘Teachers found that the more they do, the higher the effectiveness of their teaching. Ultimately, it is beneficial to the students. This is the reason why they try. ... Our subject teachers are famous in school. Students love them and are very attentive in the lessons. Teachers want to assist our students in learning, which encourages them to do more and try more new ideas with

their teammates (Principal)

Subject teachers understand the potential risk of introducing innovative ideas in teaching, but high job satisfaction encouraged them to actualize innovative ideas for enhancing students' learning. They believe that they can overcome risk and actualize innovative ideas as planned with trustworthy colleagues in the mathematics department.

4.3.2.4 Enhancing mathematics teachers' teaching performance

When compared with improving the general performance, (which is mentioned in the framework for analysis), this case indicates that the subject coordinator's entrepreneurial behavior may enhance teachers' teaching performance. Subject teachers and core members stated that they acquire the skills of developing new subject-based materials, which in turn enhances their teaching performance. Because they are one of the developers, subject teachers are familiar with the subject-based materials which then integrate smoothly into teachers' teaching and their teaching pedagogy. Thus the teaching performance is enhanced.

'Students are primary six now. I will use the materials as revision sources in my lesson. I am familiar with these materials. When I teach, I simply draw upon some materials in my lesson.' (Core member C)

Most importantly, most teachers emphasized that the subject coordinator inspires them to reflect upon their teaching and learning. In developing and executing the curriculum, the mathematics coordinator encouraged colleagues to reflect on successful experiences. They designed a systematic review system to collect their thoughtful feedback. Subject teachers realize that the self-reflection process helps them to review and uphold their teaching performance.

'Our team are amusing. We love sharing. No one is a selfish person. Everyone shares what they learned. That's why we always reflect together.' (Subject teacher B)



‘Whatever we do, we are required to write a reflection for it. This is a teaching and learning evaluation. We need to submit it. ... This is the reason why we teach better.’ (Subject teacher A)

Moreover, subject teachers reflect upon their teaching because it ensures a successful experience. Teachers explained that the successful experience of implementing the new curriculum has become a major reason for reflecting upon their teaching and learning strategies. The practice of self-reflection assures the quality of teaching.

‘This is my first year for teaching P5 mathematics. I am so nervous. Students have a higher expectation of my teaching because I am the mathematics lady. I am well prepared and reflect upon my teaching. These are the motivation for me to do better in teaching.’ (Subject teacher A)

To summarize the finding of enhancing the subject department performance, the subject coordinator’s regular operation, practice, and support cultivated a trustworthy relationship among colleagues. Her practice and support promote core team members’ and subject teachers’ efficient handling of the new curriculum. Teachers had the opportunity to experience successfully implementing new pedagogy. They might even contribute and actualize their own innovative ideas themselves. This motivates them to try more new ideas. With the guidance of the subject coordinator and core members, subject teachers reflect upon their teaching, which enhances subject department teaching performance.

4.3.3 Cross subject knowledge transfer – Promoting organizational learning

Compared with promoting organizational learning, the scale of learning is smaller than expected in this case. The subject coordinator contributes to cross-subject knowledge transfer at school. When the subject coordinator acquires new competencies in managing their innovative teaching and learning strategies, her colleagues are influenced by her and acquire these new competencies as well. In the mathematics department, many teachers need to teach other subjects at the same time. These teachers from the mathematics department might also contribute their experience of the school-based curriculum in other

subjects. They shared their experiences with other subject teachers as a reference for developing subject-based materials. For instance, language subjects imitated the teaching strategies of filming and introduced some characters in their subjects as well.

‘The language subjects also recorded a video for teaching. Another subject also. We have a character card for students. They imitated what we have done.’
(Subject coordinator)

‘Some teachers also teach other subjects. When we discuss issues, we share our experience. They take this as advice and modify their teaching.’ (Core member C)

Senior management believes that the outstanding performance of mathematics teachers motivates colleagues in other subjects to perform better in their teaching. According to their observations, some teachers, who resisted adopting new pedagogy, tried to participate in using or developing teaching materials to improve their teaching. The success of the mathematics subject curriculum is the invisible pressure it applies on other subjects to be more innovative and hardworking.

‘I am not sure that language subjects are imitating mathematics teachers’ strategies. They are not the same. ... Let me give you an example - teachers found that they got the award, therefore, they also try to do it. No one forces them, they do it on their own.’ (Vice Principal)

‘They may influence other teachers. Because of them, our school teachers become more positive. ... People need a role model.... Bandwagon effect. When they saw their success, other teachers followed them. We are not going to force them to obtain the award. ... I would say... our school teachers become more positive. They drive teachers to perform better.’ (Principal)

4.3.4 Promoting schools uniqueness as comparative advantage

The excellent performance of mathematics teachers promotes the comparative advantage of the schools’ uniqueness. Uniqueness means that entrepreneurial teachers develop unique

resources, which are suitable for their individual schools. These resources distinguish their school from other schools when it comes to the branding of their school. The school highlights the impact of their uniqueness to the public. The mathematics department designs all resources by considering their students' character and ability. Because these resources were tailor-made for students and teachers, they are unique resources for facilitating learning.

‘It is quite embarrassing to talk like this. Honestly, we can use the textbook. That may work. However, our materials are subject-based. Students can feel the sense of belonging to our materials. They are dedicated and engaged. We (Teacher and student) have memories of learning. This is what we find special.’ (Subject teacher C)

The school decides to promote the uniqueness of mathematics materials as the primary focus of school branding. One of the core members is in charge of school promotion. She said, in promoting the school kindergarten, a mathematics character card and souvenir served as a gift for parents and children. Mathematics has become a symbol of the school. Some parents participated in the school open day for observing how the mathematics department works because they learned about it through hearsay from other kindergartens' parents and teachers. They wanted to work out how outstanding the teaching and learning of mathematics is.

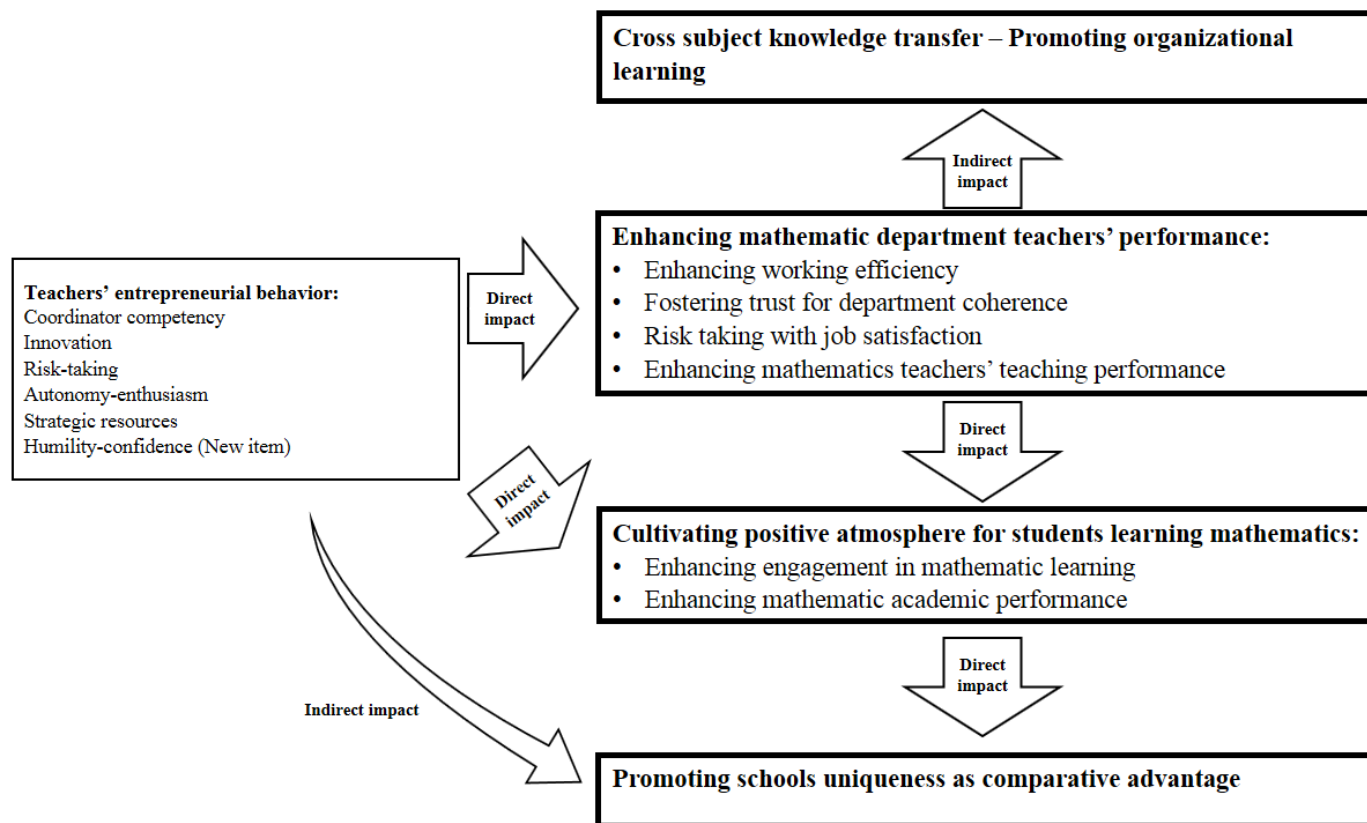
‘Some kindergarten teachers know that we have a mathematics king and god. In promoting the school, we have many souvenirs and leaflets for parents. They like that. We become the selling point for the school. ... Kids like our things. Some parents also have a general understanding about us. They think about the teaching and learning of our subject. They are quite positive. They appreciate our extra effort and resources in promoting mathematics.’ (Core member C)



4.3.5 Summary of the impact of TEB

The primary purpose of developing a school-based curriculum was to cultivate a positive mathematics learning environment for students. Figure 4.3 illustrates the impact of TEB on students' mathematic learning, mathematics teachers, other subjects, and branded uniqueness within the school. In the process of developing subject-based materials and strategies, the subject coordinator and core members have a positive impact on subject teachers, enhancing their teaching performance. Furthermore, their successful experience also had the indirect consequence of influencing other subjects and constructing a unique branding for the school. Through the interviewee and evidence findings, I discovered that TEB mainly contributes to the students' learning performance and teachers' development.

Figure 4.3 Impact of TEB



4.4 The Conditions for Enhancing TEB

According to the interviewees' responses, principal leadership, subject department culture, and subject communication are the major conditions for enhancing TEB in developing a school-based curriculum. In this section, I state the findings of the conditions in principal

leadership and subject department practice.

4.4.1 Principal leadership

The subject coordinator and subject teachers emphasized the importance of the Principal's leadership in facilitating TEB to develop the school-based curriculum. In this part, I analyze how the Principal constructed a favorable condition for the entrepreneurial teacher.

4.4.1.1 Providing administrative support

The Principal facilitates the subject coordinator to lead mathematics teachers in generating and implementing innovative ideas by providing administrative support. This means that the Principal encouraged teachers to try new pedagogy and cleared the obstacles for teachers. The Principal encouraged the subject coordinator to propose the innovative idea of developing a school-based curriculum. He listened to her suggestions and clarified her needs in implementation. He called it bottom-up management in generating the idea. Based on the subject coordinator's idea, the Principal sought financial committee and senior management advice to analyze the possibility of actualizing the idea and explored the supporting measures for teachers. This decision-making process indicated that he is an open-minded leader with a systematic management style.

'Most likely, teachers propose new things for us. Then we figure out how it works and decide the support. We will recommend some experts or information to them. ... We have a capable team. We come across with the idea and discuss with the finance committee and senior staff. We provide sufficient support for them. Our office also helps them to work it out. That's what we have got.' (Principal)

The Principal understood that the process of planning and organizing the curriculum consumes mathematics teachers' time. Teachers already have the difficulties of teaching overload. To address this issue, he decided to reduce the teaching lessons and allocate a co-planning session for the core team members and experienced teachers. The co-planning session provided room for entrepreneurial teachers to discuss or generate new ideas for

teaching and learning. This is an example of clearing the obstacles of teachers' overload in teaching hours.

‘From an administration perspective, the Principal showed support.’ (Core member A)

‘We have a co-planning session with the team members. In the beginning, we are not core team, there are only some experienced teachers. It’s around twice a week. We have more time for generating the ideas. I have to say that this is what the school does for us. They support us to have this time slot.’ (Core member B)

With regard to resources, the Principal wanted to provide sufficient support for teachers to concentrate on teaching. In addition to the general office, he employed many teaching assistants to handle teaching materials. These teaching assistants were not only serving the mathematics department. Every subject can seek their assistance when needed. His idea was beneficial to the mathematics teachers in developing school-based curriculum. One of the teaching assistants was the expert in making animation and recording. He helped mathematics teachers to solve various technical problems.

‘We have many teaching assistants. They help teachers to handle many tasks, so they can focus on teaching. If the mathematics materials relied solely on teachers, it would be impossible. ... Teaching assistants are not only for the mathematics department. They serve everyone.’ (Principal)

‘He (Principal) is very supportive. We are so lucky that former and present Principals are very supportive. They provide teaching assistants for us. It helps a lot.’ (Subject coordinator)

In reality, there are many administrative difficulties in developing the school-based curriculum. The subject coordinator has limited authority to clear these barriers. However, the Principal plays the mediator to facilitate the subject coordinator to actualize their plan with administrative support.

4.4.1.2 Providing direction

The Principal provides direction for the subject coordinator to perform her TEB with minimal intervention and great trust. Giving direction means that the Principal has an operational direction for teachers to meet in the school year. As usual, the principal decided the school's major concerns at the beginning of the academic year, this was the direction for the subject department plan and development.

‘Our Principal provides a different element (major concern) for us. Our duty is allied with the major concern. For example, our major concern is maintaining justice.’ (Core member C)

Once the Principal decided the direction for the teachers, he minimized his intervention at the operational level, the subject coordinator could develop various strategies to fulfill the major concern. The Principal did not interfere with subject department operation, His only concern was the potential risk of teachers’ innovative strategies. When he foresaw any potential problems, he would contact and provide suggestions for the subject coordinator immediately. As the subject coordinator explained, she can develop funny videos for students because she enjoys less intervention from the Principal.

‘He (Principal) gives suggestions. In fact, he seldom talks too much. He lets you try and do it. For example, we have an interactive drama. We were worried about the effect and sought his advice. He was very neutral and only stated some opinions.’ (Core member A)

‘Some colleagues are hardworking. They work too fast, we will cool them down, keep it slow. We are afraid this may affect other stakeholders. They need to understand that they are not the one being affected. ... I must remind them. ... Just like e-learning, some colleagues suggest providing training. We asked them do it step by step. It's not like ... suddenly all bring an I-pad’ (Principal)

When the subject coordinator found any difficulties in developing the school-based

curriculum, the Principal would listen to her suggestions. It was a habit for teachers to have a proposed solution to the problem. The principal allowed teachers to modify their solution as a safeguard only.

‘In our meetings, they are very responsive. For example, they have a problem in arranging a coach. Our colleagues have a perfect habit of having some solution to the problem already. I must say that this may not be the final decision. Sometimes, I need to overview the impact of the solution. Providing guidance is needed.’ (Principal)

In most cases, the Principal found that the subject coordinator has mature solutions. He approves and minimizes his intervention on the subject coordinator’s suggestions. This is the reason why the subject department has high autonomy in deciding the content of their curriculum.

4.4.1.3 Giving staunch personal support

Giving staunch personal support plays an important role in facilitating the subject coordinator’s entrepreneurial behavior in the school-based curriculum. Giving staunch personal support means that the Principal takes an active role participating in the functioning of the department and recognizes the teachers’ contributions. The Principal is supportive in being one of the characters in the mathematic kingdom. His character is in teaching materials, such as souvenirs, videos, and teaching packages, etc. Figure 4.4 illustrates an example of participating in innovative pedagogy. In recording the video, the Principal purchased his own costume and used his own time to complete the video recording.

‘We have many characters. The Principal is one of our characters.’ (Core member C)

‘To participate in our production, the Principal bought his costume himself. We didn’t pay for him ... You can see that he is in the video too.’ (Subject coordinator)

Figure 4.4 example of Principal support (First in left-hand side)



The Principal explains that he leads as the role model for supporting and encouraging teachers' innovative ideas. Moreover, participating appreciatively in the new pedagogy is a motivation for recognizing the entrepreneurial teachers' contribution.

‘The reason for participating in the activities is leading by example. ... Our colleagues have enthusiasm for teaching. We only need to do some minor things to support them’ (Principal)

‘Appreciation is significant. We should admire their hard work in trying new things. ... This is our school culture. Our recognition and appreciation is a motive for encouraging them to do more.’ (Principal)

The subject coordinator appreciates the support of the Principal. She found confidence in developing the material because the Principal is giving staunch personal support to the subject-based teaching package and mass media education. His support also convinces subject teachers to be devoted to the curriculum development.

4.4.2 Subject department practice

4.4.2.1 Embedding a trusting and open culture

The culture of the mathematics department is openness, which allows the subject coordinator to consult teachers' advice in performing her entrepreneurial behavior. Embedding a trusting and open culture means those subject teachers can voice their concerns through formal and informal communication channels. As stated in the TEB section, the subject coordinator has the attribute of collective decision making in the

coordination competency. According to senior management observation, they adopt an open-minded approach to collecting teachers' feedback and suggestions.

‘Our subject coordinator is a systematic person who encourages colleagues to voice their suggestions. She motivates them to do it. ... We always emphasize harmony. If you care about teachers, they will have a sense of belonging. They will speak out.’ (Vice Principal)

In the formal meeting, subject teachers have the right to judge the subject coordinators' ideas. They aim at ensuring the quality of teaching and learning which is beneficial to students. Therefore, teachers feel that they are sharing opinions in the judging process in a happy atmosphere.

‘In our subject, you can say anything you want... we try to stimulate others thinking every time. We find that is fun. We can do things in a different way. More colleagues are affected. That's unexpected.’ (Core member C)

‘Our subject teachers are willing to share their ideas and opinions. Then, we will dig in and see how it goes. So, I will listen. It is something we cherish.’ (Subject coordinator)

Many new ideas are contributed by subject teachers. Subject teachers relish that their concept and opinion is taken into account by the subject coordinator and core team members.

‘If there is anything new, we will discuss it together. They listen and see the possibility. ... The mathematics card is my idea. ... We make it for our students. They like this, I feel happy about it.’ (Subject teacher B)

4.4.2.2 Systematic communication network

The systematic communication network is a platform for the subject coordinator and core members to deliver ideas and perform entrepreneurial behavior in developing the school-

based curriculum. As the framework for analysis stated, communication networks play a moderating role in facilitating subject teachers' teaching at the school.

‘Co-planning is our subject culture. Sometimes, we will bring a new idea about teaching into co-planning. We explain how to do it and what the difficulties are for us. We are at the front-line that contributes to and monitors the pedagogy in co-planning.’ (Subject coordinator)

‘Core members attend the co-planning sessions. In fact, we learn things from the co-planning. They guide us through it.’ (Subject teacher B)

For instance, they have a systematic process to disclose and collect information in the co-planning and regular meetings. As subject teachers stated, this systematic communication channel facilitates the subject coordinator to mobilize colleagues to perform their innovative idea. It offers an opportunity for teachers to express their concerns and deliver innovative pedagogy to others. When subject teachers acquire new competencies or information from other platforms, they also share the experience through this communication system. Furthermore, this system extends to the reflection process where teachers need to write a reflection on what they have learned in the sharing.

‘We have a practice that we send some colleagues to training. I remember that I taught P4 multiple calculations. I was assigned to attend the course. ... I needed to share all information in a mathematics co-planning meeting.’
(Subject teacher B)

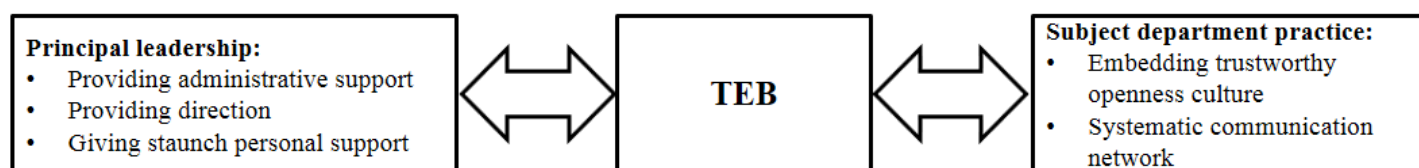
The communication system is not only the channel for the subject coordinator to lead teachers but is also an effective platform for enhancing teachers' teaching performance and learning.

4.4.3 Summary for the conditions of enhancing TEB

To conclude, Figure 4.5 indicates the conditions for enhancing TEB. In developing and implementing subject-based teaching materials, principal leadership and subject

department practice play an important role for entrepreneurial teachers.

Figure 4.5 Conditions for enhancing TEB



4.5 Conclusion

This chapter reviews the process by which the subject coordinator performed TEB in developing a school-based curriculum, which connects to the framework for analysis. With regard to TEB, the problem of students' lower learning motivation in mathematics inspired her to figure out alternatives to traditional teaching strategies. She exhibited high ability in coordinating the school-based curriculum with core members and in generating innovative pedagogy. She took the risk of conducting the pilot sampling. To implement the project smoothly, she sacrificed her time and resources which mobilized teachers to take the initiative in generating the innovative ideas. During the process of developing the curriculum, she devoted her time to seeking internal and external resources to support teachers. The above findings echo and complement the meaning of TEB for the framework for analysis.

With regard to the impact of TEB, this case provided a concrete idea of the impact of that behavior on the framework for analysis. In terms of general performance, I understand that it stands for teachers' teaching and teachers' perception of student learning. The entrepreneurial teacher boosts teachers' performance through close interaction with them, which is a process of influencing, rather than a one-off event. It is difficult to form a direct link between TEB and the students' performance. However, the entrepreneurial behavior is the primary factor in constructing a curriculum, which makes for favorable learning conditions in which students to learn effectively.

Compared with the framework for analysis; this case reveals that the number of conditions in enhancing TEB is comparatively smaller than expected. I identified principal leadership, culture, and communication, which facilitate TEB in this case. However, market orientation,

rewarding, and entrepreneurial course were not found in the study. On the other hand, this case clarifies some conditions, learning by doing and self-reflection, are not conditions for the entrepreneurial teacher, rather they are factors of the subject coordinator's TEB, which she performed in the process of developing the curriculum.

Furthermore, I would like to highlight three distinctive findings in this case. First, the impact of entrepreneurial behavior is directly related to the other teachers' performance. We originally expected that an entrepreneurial teacher influences students directly, but the findings indicated that other teachers were influenced and this caused the changes. Second, humility-confidence is a new finding in this case. There is no literature discussing this behavior in entrepreneurial behavior studies. Humility-confidence, which nurtures trust among teachers, could be a unique finding in the education sector. Lastly, the impact of principal leadership is higher than I expected. In this case, the principal plays an important role in facilitating TEB. In the next two cases, I explore whether the above distinctive findings are the core elements of TEB.

In conclusion, table 4.3 indicates how these findings respond to the research question. The subject coordinator, who is the core entrepreneurial teacher, mobilizes subject teachers to be entrepreneurial teachers as part of an entrepreneurial team. With the support of the Principal and subject department systematic practice, entrepreneurial teachers have adopted the small step approach to developing a subject-based innovative curriculum over the past ten years. TEB interacted with schools' conditions and impacted their performance. Nowadays, mathematics teachers continuously contribute various innovative ideas for teaching materials and subject-based videos. Although the platform of pedagogy doesn't change, the content of teaching is constantly updating.

Table 4.3 Responses to research questions

Research questions	Research niches	Findings	Summary
1. How do teachers and leaders understand and enact TEB and its components?	There is an insufficient understanding of the definition of TEB, it is valuable for me to explore this research niche in this study.	TEB: Coordination competency Innovation Risk-taking Autonomy-enthusiasm Strategic resources New items - Humility-Confidence	Significant findings of this chapter: <ul style="list-style-type: none"> - Response to research question Special findings of this chapter: <ul style="list-style-type: none"> - Entrepreneurial teacher encouraging team members to perform some entrepreneurial behavior - Humility-confidence for fostering trust among teachers - The importance of principal leadership for facilitating TEB
2. How do they perceive TEB's impact in schools?	Various meanings of impacts in the business and education context: 1. Diverse context between the business and education sector	Direct impact: <ul style="list-style-type: none"> - Enhancing mathematic department teachers' performance Indirect impact: <ul style="list-style-type: none"> - Cultivating positive mathematic learning atmosphere for students: - Cross subject knowledge transfer – Promoting organizational learning - Promoting schools uniqueness as a comparative advantage 	
3. What school conditions enhance or challenge TEB?	Insufficient understanding of how conditions interact with TEB: 1. Lack of in-depth understanding of various conditions (e.g. Leadership style) 2. Needs of understanding the interactive relationship between schools' conditions and TEB	Principal leadership: <ul style="list-style-type: none"> - Providing administrative support - Providing direction - Giving staunch personal support Subject department practice: <ul style="list-style-type: none"> - Embedding trustworthy openness culture - Systematic communication network 	



Chapter 5 – Case two: Entrepreneurial Teacher as a Curriculum Leader

Purpose of This Chapter

In this chapter, I present the story of an entrepreneurial teacher, a curriculum coordinator, who leads reform across all subjects. In section 5.1, I explain the background information about selecting this case and how entrepreneurial teachers promoted the school-based curriculum (All subject reform). Based on the sequence of reform, I analyze the findings of how the Curriculum Coordinator performed the entrepreneurial behavior at school and the impact of that behavior. Afterward, I analyze the conditions of enhancing TEB and draw the conclusion.

5.1 Background Information of the Entrepreneurial Teacher

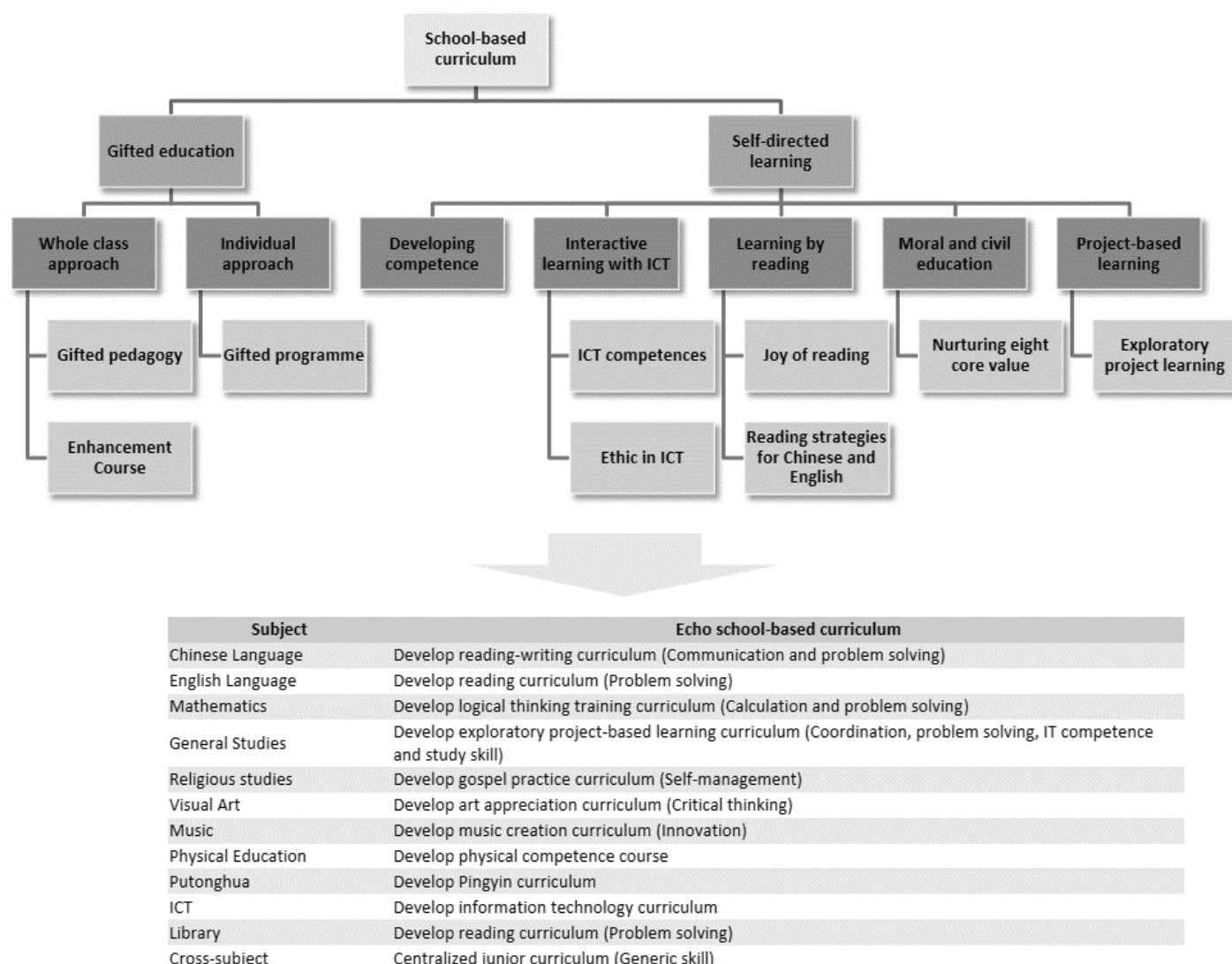
The entrepreneurial teacher scored the highest mark among all targeted schools. In this section, I explain the achievement of the entrepreneurial teacher and the role of being a curriculum developer at school. Finally, I clarify the context of this case to analyze how the entrepreneurial teacher performed entrepreneurial behavior and the impact that it had in school.

5.1.1 Selection of the entrepreneurial teacher

The Curriculum Coordinator is the entrepreneurial teacher in a prestigious primary school. In 2015, she was awarded for her outstanding school-based curriculum (All subject reform) with the Chief Executive Teaching award. There were two reasons for her to develop the school-based curriculum (All subject reform). First, EDB introduced curriculum reform in the primary school sector. Second, the Curriculum Coordinator and the Principal found that the former school-based curriculum was not unified across all subjects. The Curriculum Coordinator decided to develop a new school-based curriculum, which connected every subject at school. Her idea was that there were two major themes, gifted education, and self-directed learning. Every subject developed the subject-based curriculum to echo the school's major theme and connect coherently with other subjects. Starting from the schools' motto, they went through the process of planning, developing, implementing and assessing a school-based curriculum for every subject across the curriculum. Figure 5.1 indicates the design of the entrepreneurial teacher's school-based curriculum (All subject reform). They

aimed at linking all subject-based curricula to the school-based curriculum (All subject reform), echoing the direction of the two major themes. They also aimed at nurturing students' high-order thinking, innovation, and interpersonal skills. This school-based curriculum (All subject reform) is a whole-school approach that aligns the teaching of every subject with the major theme of the schools' curriculum. This was a thorough change from the traditional school approach to curriculum and pedagogies.

Figure 5.1 School-based curriculum design



With regard to the selection criteria, the judges and I gave high scores for the entrepreneurial teacher, shown in table 5.1. Judges found that the entrepreneurial teacher was the first teacher who integrated all subjects as a school-based curriculum (All subject reform) in Hong Kong. This stupendous curriculum reform required a high level of ability

in planning and managing all subjects, and was risky for the school. In reality, this school had been established for over 150 years with a religious background. As a famous school in Hong Kong, they did not need to make the changes, because many parents already knew of and favored their school. Their pupils' admissions into secondary one were excellent. Therefore, we all agreed that the entrepreneurial teacher was risk-taking.

Table 5.1 TEB score for case two

Judges	Innovation	Risk-taking	The ability to plan and manage a project	Autonomy with a positive attitude	Seeking external resources	Sub-total	Total
I	4	4	4	3	4	19	55
Judges A	4	4	4	4	3	19	
Judges B	4	4	3	3	3	17	

5.1.2 The story of the entrepreneurial teacher

5.1.2.1 *Being a Certificate Master*

The Curriculum Coordinator was a Certificate Master (CM), and a subject teacher for Chinese language and general studies in this prestigious school. She had only served in this school for four years, compared with more experienced teachers. She was hardworking and well-organized, which drew the attention of the Principal and Vice-Principal. In the 2000s, the government promoted the school-based curriculum. Every school needed to nominate one experienced teacher to be the curriculum coordinator. She applied to monitor and develop the school-based curriculum in the school. This position was at the Primary School Master (PSM) level, which is two levels higher than the Certificate Master. The Principal was keen to promote her to the position of Curriculum Coordinator because of her outstanding and energetic performance. Although the school management committee was hesitant to promote a junior member of staff to be the coordinator, the Principal insisted on offering her this opportunity which she decided to accept.

5.1.2.2 *Changing the school*

The Curriculum Coordinator had no experience in curriculum planning and leading. Therefore, she participated in all curriculum development training and studied on her own. Through the combination of a rigorous school review and personal experience, she identified two significant problems in her school. She found that although their students

were well-behaved and knowledgeable, they lacked the skills to integrate the subject knowledge into their daily lives. In addition, there was a problem in the lack of learning diversity, the gifted and less-able students were not properly catered for in the teaching curriculum. To address this problem, she decided to develop a school-based curriculum, which was mentioned in 5.1.1. She promoted gifted, and self-directed learning education in Chinese and general studies subjects first. Based on this successful experience, she mobilized other subjects to develop their own subject-based curricula. To ensure that she was involved in the design of every subject-based curriculum, she developed a matrix subject operation system for developing a school-based curriculum.

With the support of the Principal, the Curriculum Coordinator employed the matrix subject operation system instead of a hierarchical subject operation system. Traditionally, there were two subject coordinators responsible for the junior and senior curriculum. The curriculum development committee decided the direction for the subject department and monitored the process by reading the plans and reports. However, this school had clear responsibilities for two subject coordinators. Referring to table 5.2, subject coordinator A is responsible for the school-based curriculum development and B is responsible for routine operations. The Curriculum Coordinator specified that subject coordinator A is for innovation, while subject coordinator B is for quality assurance and backup. The form coordinator is the frontline manager who monitors and executes the routine and innovative pedagogy at school. The curriculum development committee holds regular meetings and, serves as an innovation team. They are also involved in each section to ensure the quality of the school-based curriculum by reading the report or participating in the meeting. Meanwhile, the subject department has regular subject-based meetings. The matrix subject operation system ensures the penetration of the school-based curriculum and supervision of the routine operation of each subject.

Table 5.2 Matrix subject operation system for developing school-based curriculum

	Curriculum Development committee (CDC)					
Subject coordinator A (Curriculum development)	Chinese subject coordinator A	English subject coordinator A	Mathematics subject coordinator A	General studies subject coordinator A	Other subject coordinators A	Develop school-based curriculum with CDC
Subject coordinator B (Subject operation)	Chinese subject coordinator B	English subject coordinator B	Mathematics subject coordinator B	General studies subject coordinator B	Other subject coordinators B	Maintain department routine operation with CDC
Subject form coordinator	Six form coordinators for each subject					Monitor and execute the routine and new pedagogy with CDC
	Chinese subject	English subject	Mathematics subject	General studies subject	Other subjects	
	Regular subject meeting					



In designing the subject-based curriculum, the Curriculum Coordinator bore in mind that all subject-based curricula should be aligned with the major theme of the school-based curriculum. She also emphasized the integration of subject knowledge. Therefore, all subject-based curriculum can interconnect with other subjects. They even have a ‘school-based curriculum subject’, in which students apply all their subject knowledge in activities and projects.

5.1.2.3 Difficulties in actualizing curriculum

The Curriculum Coordinator was suddenly promoted to be in-charge of all subject curriculum. This unusual promotion and new challenge created many difficulties and barriers for the curriculum reform. In general, I summarized participants’ feedback on difficulties in five major categories. The first difficulty was the technical skills. Curriculum development was a new concept for the entrepreneurial teacher that she has no relevant knowledge and skill of this professional. In the beginning, she needed to overcome this barrier. The second difficulty was the resources issue. As a new agenda in the education sector, there were a few resources about curriculum planning. The entrepreneurial teacher found difficulties in identifying a role model and materials for their school. The third difficulty was about dealing with higher-ranking experienced teachers. The entrepreneurial teacher was promoted to the higher ranking that supervises many higher-ranking experienced teachers, who did not believe in her capability. As a result, most subjects did not follow her instruction at the beginning. The fourth difficulty was the professional development of teachers. Even entrepreneurial teachers needed to acquire new competence to promote school-based curriculum planning. Most teachers had no relevant knowledge and skills to accommodate the changes. She needed to form various strategies to equip teachers. The fifth difficulty was about the unification of whole-school-curriculum. The principal would like to align all subject and echo the school mission. However, most subjects already formed a specific focus for the students. It was difficulties for the entrepreneurial teacher to convince the subject curriculum to redesign the curriculum. Obviously, the above challenging can be simply divided into the human relationship and technical problems. For the technical issue, such as technical skills, professional development of teachers, and resource issue, I stated it in an entrepreneurial teacher’s

autonomy and learning community's part. For the human relationship, such as dealing with higher-ranking experience teacher, and unification of whole-school-curriculum, it mainly stated in the principal leadership and entrepreneurial teachers' autonomy-enthusiasm part.

5.1.3 Context of case

I summarize section 5.1 information in Table 5.3. The context of this case study is the process of developing the school-based curriculum (All subject reform), which illustrated how the Curriculum Coordinator performed the entrepreneurial behavior at school. I interviewed the Principal, four subject coordinators, and the former Vice-Principal. They were the curriculum development committee members, who worked closely with the Curriculum Coordinator. We studied their school documents, curriculum booklet, and all students' works at high, middle, and low level. All materials were relevant to the school-based curriculum (All subject reform), which was developed by the entrepreneurial teacher. We began by analyzing the founding of TEB, before moving on to study the impact of entrepreneurial behavior and the conditions needed to enhance that behavior in school.

Table 5.3 Background information of case two

	Detail
Entrepreneurial teacher	Curriculum coordinator
School	Band one prestige school in Hong Kong
Year of award	2015
Reason for award	School-based curriculum (All subject reform)
Scores from Judges	55/60
Boundary of case – Events	The process of developing the school-based curriculum
Boundary of case – Interviewees	Senior – Principal and Vice-principal Colleagues – 4 subject coordinators (Curriculum development committee members)
Boundary of case - Others sources	1. Teaching and learning materials 2. Subject plan and report 3. Students' work (High, middle, and low level) 4. Curriculum booklet

5.2 Performing TEB as a Leader

The Curriculum Coordinator had the opportunity of performing autonomy-enthusiasm from the day she started serving in this primary school. However, other entrepreneurial behavior was not evident until she was appointed to the position of Curriculum Coordinator.

She was then able to perform and develop her entrepreneurial behavior in the development of the school-based curriculum. In this section, I present her entrepreneurial behavior by following the sequence of developing the school-based curriculum.

5.2.1 Autonomy-enthusiasm

Before her promotion to Curriculum Coordinator, the entrepreneurial teacher illustrated strong autonomy-enthusiasm in handling her routine duties. The Principal and senior management recognized her effort in teaching and learning, because of the need to promote a school-based curriculum, the senior management decided to promote her to the role of Curriculum Coordinator. As the coordinator in developing the school-based curriculum, she was able to impress her colleagues with the autonomy-enthusiasm attributes which follow.

5.2.1.1 Visionary

Before her promotion to a coordinator, the entrepreneurial teacher showed an extraordinary sense of vision in subject development. She realized that some students, who were attentive and cheerful in lessons might score lower marks in the examination. Furthermore, some students were outstanding in academic achievement but lacked life skills. She believed that students have multiple intelligence in varied aspects, such as leadership, interpersonal and academic skills. She voiced her concerns to colleagues. The vision of developing students' life skills became the goal of the general studies curriculum reform, which was the first subject to implement the school-based curriculum.

When she was promoted to be the coordinator, colleagues recognized that she was a forward-looking leader. In the interviews, all interviewees stated that she is sensitive to the new trends in education development.

‘She is a visionary person. Somehow, her vision was even ahead of education trends. Every step she decided was far in front of other schools.’
(Subject coordinator C)

Based on her understanding of the trends in education development, the Curriculum Coordinator decided the direction for the school-based curriculum development. The subject coordinator, who developed the curriculum with her, experienced how the Curriculum Coordinator's vision guided through the difficulties of curriculum reform. Therefore, all of them stated that the Curriculum Development Coordinator was a visionary leader.

5.2.1.2 Autonomy

The Curriculum Coordinator took the initiative to complete both assigned tasks and personal goals. As a visionary leader, she realized that she lacked the competencies to actualize the reform. This is a technical difficulties that she has no curriculum planning knowledge and limited resources support. Therefore, she sought EDB office assistance and joined the professional learning community.

‘I was in the same learning community with her (Curriculum development coordinator). The leader is from EDB. She has a great influence on both of us. I think we are the first cohort of the teacher professional learning community in Hong Kong.’ (Subject coordinator C)

In the learning community, the Curriculum Coordinator learned the strategy for promoting the school-based curriculum. Furthermore, she was not only participating in the network but also the training workshop.

‘There was a PSMCD training workshop for us. I attended all workshops. There were various experts who shared their insightful experience with us.’
(Curriculum development coordinator)

In the training workshops, the Curriculum Coordinator acquired some of the practical skills needed to lead subject coordinators in the curriculum reform. According to the subject coordinators' descriptions, they were also pioneers in promoting teacher professional learning communities. This shows that the Curriculum Coordinator has an awareness of

education development trends and takes the initiative in achieving her vision as a continuous learner. Her autonomy is to explore various learning opportunities to equip herself with the relevant competencies for leading the school-based curriculum.

5.2.1.3 Self-sacrificing

The Curriculum Coordinator is dedicated to performing her duty. Subject coordinator A, who has been her close partner for many years, describes her as being a hard-working teacher from day one.

‘She works hard to nurture students’ growth. She is dedicated to seeing the students’ improvement’. (Subject coordinator A)

She has a sense of responsibility to cater for students’ needs that dedicates her to teaching and learning. Students’ improvement is the main driver for her. All interviewees stated that she dedicates her life to the school-based curriculum.

‘She does not care about herself. However tired she was or if time was limited... I chatted with her sometimes. I reminded her of the importance of taking care of her family. She focused on her duty alone.’ (Subject coordinator C)

According to the subject coordinator C, her promotion strengthened her self-sacrificing practice, which showed in her enthusiasm for developing the school-based curriculum. She even sacrificed family time for the development of a school-based curriculum.

To sum up, the Curriculum Coordinator has a visionary mindset in her education career. This is similar to case one’s subject coordinator, whereas in this case interviewees specified this TEB as a visionary attribute. The visionary mindset became the driver behind her initiative to learn to implement the new curriculum, whatever the sacrifice to her personally. Senior management and colleagues observed and appreciated these attributes, they were the primary reason for her promotion. Moreover, taking the position of the Curriculum

Coordinator not only provided a platform for her to demonstrate these attributes but also reinforced her autonomy and self-sacrificing behavior.

5.2.2 Risk-taking

As the Principal explained, the primary reason for promoting the Curriculum Coordinator was the appreciation of her autonomy-enthusiasm behavior. The nomination was a risky decision for both the school and the coordinator. When Principal suggested the promotion to coordinator in-charge of curriculum development, there were concerns from the school management. The Curriculum Coordinator stated that she understood the potential risk of leading the whole school curriculum, however, her vision of curriculum reform motivated her to accept the offer. She treated this promotion as an opportunity to launch the curriculum reform at school.

In developing the school-based curriculum, the Curriculum Coordinator also foresaw the potential risk of technical and human problems.

‘We worry about the continuous assessment mark for students. The proportion of new curriculum assessment is a challenge for colleagues. We need to convince parents and the Principal.’ (Subject coordinator D)

‘We were going to dispose of all textbooks. Colleagues were used to teaching by the textbook. They challenged the purpose of using the school-based materials. They liked the traditional practice.’ (Subject coordinator A)

She understood the technical problem that some assessment might affect students ranking in the continuous assessment mark and that parents and the Principal would have great concern about this. There was also the human problem that they expected some teachers to exhibit resistance to the changes and not support the school-based curriculum. The Curriculum Coordinator considered the potential risks of these technical and human barriers and understood the necessity of handling them in implementing the new school-based curriculum. She also foresaw the problem of communicating with higher-ranking experienced teacher that they might not take her advice. However, she saw the curriculum

reform as an opportunity to fulfill her vision of fostering students' intelligence and overcoming the technical and human barriers.

‘Our students are smart and well-behaved. In other words, they are quite passive... I hope to spark or enlighten our students through the curriculum reform.’ (Curriculum development coordinator)

‘We don't need to worry about changing. This is something we should do. Change our habits and enhance teacher performance in teaching. This is a chance. If we can make it, colleagues will follow.’ (Curriculum development coordinator)

Starting from the first day of developing the school-based curriculum, the Curriculum Coordinator led all subject departments to develop the subject-based curriculum one by one. Even though subject coordinators and the Curriculum Coordinator herself foresaw the opposition from teachers, she treated the risk as a chance to reform. From her point of view, the risk-taking behavior was a process for her to pursue the vision of school reform.

5.2.3 Strategic resources

Strategic resources are standard practice in developing the school-based curriculum. Although the Curriculum Coordinator realized the opportunity of promoting the school-based curriculum, she understood that they had no experience in developing it. Therefore, she needed to seek professional assistance.

‘I believe in what I see. I prefer to study on my own and listen to the successful experience of others. I will go to other schools and approach others for more information.’ (Curriculum development coordinator)

She was an active learner who wanted to understand how to be a coordinator of the school-based curriculum. She contacted teachers from other schools and approached the curriculum development division from the Education Bureau. She joined the professional community and workshop to acquire relevant skills in leading the school-based curriculum.

These networks became the resources for her to develop the curriculum at school.

In leading the school-based curriculum, the Curriculum Coordinator approached EDB's curriculum development division to share resources and successful experience with subject teachers. All subjects have gained support from EDB several times in the past ten years. She thought that teachers must explore the new teaching and learning pedagogy before the implementation of the school-based curriculum. When the subject school needed more resources to promote the new curriculum, she would seek expert advice and apply for the Quality Education Fund.

'For the learning project, we applied to the QEF. To ensure the possibility of success, she approached a HKIED professor to guide the proposal.'

(Subject coordinator D)

According to the interviewees' description, the Curriculum Coordinator has a blueprint in her mind. She would seek the external resources needed to mobilize colleagues' execution of the school-based curriculum step by step. Searching for resources to support the development of the school-based curriculum development became a habit. The strategic resources are the accelerating element by which she accomplished the goal of the school-based curriculum.

5.2.4 Coordination competency

As the previous section stated, the Curriculum Coordinator attended continuous professional development training and acquired the knowledge and skills to lead the school-based curriculum reform. I found that this professional development training together with her personality promoted her leadership in developing the school-based curriculum. In this section, I analyze her coordination competency in developing the school-based curriculum.

5.2.4.1 Sensible and well-organized

The Curriculum Coordinator is sensible and well-organized, she monitors developments

closely and conveys her systematic management strategies into some visible deliverables for teachers. It is her habit to monitor and lead the day to day operation and implementation of the school-based curriculum. She has set up a rigorous system in this primary school through which all plans and reports are systematically coordinated and reported to the senior management with data analysis. She is the gatekeeper who oversees all subject plans and reports. All interviewees emphasized that she reviews all documents seriously word by word. As an enthusiastic leader, she attends all regular and subject-based curriculum development meetings. If any concept appears vague, she seeks clarification from subject coordinators and teachers. She stated that this is the way to convince the higher-ranking experienced teacher to work with her.

‘She takes care of every subject and maintains a close relationship with them. Monitoring and leading do not adequately describe her contributions. Somehow, she is not leading. She works with colleagues and demonstrates her enthusiasm for teaching.’ (Subject coordinator C)

The Curriculum Coordinator not only sits in the meetings but also works with teachers as a role model. She demonstrated how to get involved in the subject-based curriculum reform in a sensible and well-organized manner. In the interviews, all subject coordinators appreciated her close monitoring and organization.

Moreover, the Curriculum Coordinator also thought about how to illustrate her systematic practice as manuals for teachers to follow. There are three examples, the school-based curriculum, lesson study and support for the new teacher. She cherishes teacher contributions to the successful school-based curriculum. In order to ensure the sustainability and recognition of the practice, she compiled a school-based curriculum guideline for teachers. In promoting the lesson study, she formed a regular review meeting for the subject and cross-subject teachers. They gathered teachers’ experiences and consolidated university expertise to compile a lesson study guide for teachers. For the new teachers, she understands the difficulties of adapting to this rigorous working environment. She compiled a new staff manual for new teachers to follow. These deliverables indicate

that she recognizes the importance of recording their successful experiences, which then become school-based training material for teachers.

5.2.4.2 Directional persistence

The Curriculum Coordinator maximizes the effectiveness of the rigorous operation system in order to cement her vision of the school-based curriculum. Through her active participation in the professional learning community, she has a strong sense of education development. In developing every subject-based curriculum, she has a direction for the reform already in mind and she explains the rationale and direction to the subject teacher in advance. All subjects must connect to the core value of the school-based curriculum, which was decided by her.

Most importantly, all interviewees also highlighted that the Curriculum Development Coordinator was a persistent leader.

‘She is very tough. Once she decides the direction, she goes straight forwards to get the job done.’ (Subject coordinator C)

‘We (Subject teachers) have a meeting with her. I found that she sticks to her belief and blueprint. That’s clear and concrete for us. No one can change her mind.’ (Subject coordinator B)

Once she decided the direction for the curriculum, she was persistent in pursuing it. She decided to closely monitor the decision-making process in the subject department meetings. Furthermore, she worked with teachers to ensure the implementation of the curriculum aligned with the plan. This part echoes to the sensible, well-organized and rigorous monitoring system which was the tool by which she persistently pursued the direction of her reforms. For instance, the development of English subject-based curriculum was a typical example in directional persistence.

‘When we discussed the content of the subject-based curriculum, she decided the master plan for us to follow... In developing the material, she

guided us to edit the content. The planning and monitoring process promoted our working efficiently to produce materials, especially the vocab list.’ (Subject coordinator B)

‘I really appreciate what they have contributed to the reform. I could not complete the whole task alone... I cried in the Principal’s office several times. Some colleagues criticized my work. However, that’s fine with me, I stick to the big picture and do everything decently. Make things work.’
(Curriculum development coordinator)

The Curriculum Coordinator had suffered from teacher resistance. However, she stuck to her direction and mobilized colleagues to implement the curriculum. As a result, the English department was the fourth subject to conduct a curriculum reform.

5.2.4.3 *Rigorous consensus*

Although the Curriculum Coordinator has the attribute of directional persistence, she is also flexible in modifying the subject-based curriculum. She constructed a matrix subject operation system, which was a useful platform for her to collect and respond to teachers’ recommendations on curriculum implementation. However, the fundamental principle of modifying the school-based curriculum must stick to her direction.

‘Some teachers may have feedback on the implementation which I will report to her. Most likely, she listens to the advice and allows us to modify the implementation process.’ (Subject coordinator D)

‘She is the core member of the committee. She discusses with SC and listens to their concern. There must be commitment and agreement among them’
(Principal)

The matrix subject operation system served as an innovative tool in developing the school-based curriculum. The Curriculum Coordinator collected their opinions on the subject-based curriculum and discussed the possibility of aligning their curriculum to the core school value. Most subject coordinators stated that she was willing to take their advice for

any amendments. They felt subject autonomy in developing the subject-based curriculum. They appreciated her great flexibility in implementation.

‘Every subject is unique in the subject-based curriculum, while we all connect to the same direction. That is her skill.’ (Subject coordinator C)

The Curriculum Coordinator maintained a balance between unifying and uniqueness in the cross subject-based curriculum. She persisted in the direction of the school-based curriculum and promoted high subject autonomy in developing the uniqueness of the subject-based curriculum.

5.2.4.4 Pilot sampling

The Curriculum Coordinator’s practice in leading the school-based curriculum employs a pilot sampling for every subject. She is an autonomy-enthusiasm teacher who urges subject teachers to implement the project learning from primary one to six at the same time.

‘I have no experience of being the coordinator. I made a lot of mistakes. That is administrative management... In the beginning, I did the general studies reform on my own. That’s okay. Then, I invited the Chinese subject. We did it one by one. I realized the importance of one by one.’ (Curriculum development coordinator)

Her impatient character caused resistance from the subject teachers’. After consulting the senior management and colleagues for advice, she reflected on her leadership strategies and decided to implement the reform step-by-step. There were two subjects which joined the curriculum reform at the beginning.

‘We ensure teachers and students neutralized the new practice first. Then, we will add to it. It is a bit slow. We explain to students, teachers, and parents again and again.’ (Subject coordinator D)

‘We decided the blueprint and launched the reform in primary three. The

reform pushes forward to the senior form year-by-year. That is the direction.

We were not that urgent.’ (Subject coordinator A)

Compared with the first curriculum reform; the Curriculum Coordinator renewed the subject-based curriculum with the subject coordinator as a seed project first. As the previous section mentioned, they decided the direction of reform and executed it with the systematic monitoring system. They convinced all stakeholders who participated and experienced the reformed practice. Based on the experience of implementation in a specific form, they promoted it to other forms as well.

As the Curriculum Coordinator explained, the seed project is the evidence which convinces stakeholders to participate in curriculum reform. The successful experience of general studies and Chinese subject-based curriculum reform illustrated an excellent example for other subjects. As a result, the English subject department also joined the subject-based curriculum reform. They spent four years developing the curriculum and three years modifying it.

5.2.4.5 Leading as a role model

The Curriculum Coordinator worked with teachers as a role model. When she promoted curriculum reform in general studies and the Chinese subject, she decided to implement it in her teaching subject and form first. She understood that teachers have no relevant professional training about curriculum planning. Therefore, she acquired relevant knowledge and skills for the new curriculum and shared them with colleagues. Her self-sacrificing practice impressed subject teachers and encouraged them to participate in the school-based curriculum.

‘Endure! We endure the difficulties of reform together. She was with us.’

(Subject coordinator C)

‘She is great. She was with us all the time. You have a clear understanding and preparation with your colleagues.’ (Subject coordinator B)



All subject coordinators emphasized how the Curriculum Coordinator motivated teachers to implement the curriculum. She is a role model devoted to the new pedagogy and sharing her experience with teachers, which became evidence for overriding resistance amongst teachers. English department teachers are a good example in that they tried to develop the curriculum with the Curriculum Coordinator at last.

To summarize the finding of coordination competency, I found that the Curriculum Coordinator's leadership enhances the process of developing the school-based curriculum. As a sensible and well-organized person, she monitors the implementation process to align with the blueprint. Although she is persistent in the primary concern, she takes constructive advice from colleagues through regular meetings and the matrix communication system. There were some setbacks with some of the teachers at the beginning. After consulting colleagues and some self-reflection, she realized the importance of starting with a seed project. As a leader of the seed project, she demonstrated an enduring spirit in the implementation process for colleagues. These leadership strategies are the combination of her personality, experience, and competencies.

5.2.5 New items - Humility-Confidence

I also identified humility-confidence from the Curriculum Coordinator in the interview. She is so confident in curriculum development. For instance, she has an idea in developing STEM education and new TSA arrangements. She believes in her direction of curriculum planning in these two areas. As she stated, in the past, she may have activated the reform immediately. However, following the experience she gained in developing the school-based curriculum, she now realizes the importance of patience and caring for teachers' feelings.

‘She is different now. Mature. I think it is about human relationships. She is sophisticated in managing colleagues now.’ (Principal)

‘I have a plan but no one knows it. You know, people don't like that. I stick to it and test it on my colleagues. If they have some drawbacks, I will consider them first. Try to work it out with strategies.’ (Curriculum

Development Coordinator)

The Principal also recognizes her progress in becoming a humble leader. She is confident in her direction when teachers disagree. She will present decently and consult teachers' advice first. She has become mature in handling teacher relationships with politicking strategies.

Moreover, she never seizes the merit from teachers. Even when she won the teacher award from EDB; she emphasized the contribution of teachers in a media interview and newsletter. In compiling the publication of the school-based curriculum guidelines, she stated the importance of colleagues' advice and contributions. Therefore, all subject coordinators stated that she is a humble person, who listens to others' suggestions and honors teachers.

According to the senior management, the Curriculum Coordinator does not want to be promoted to vice-principal. She loves being the Curriculum Coordinator and is devoted to fostering students' growth from the curriculum perspective. Being a humble leader is her goal in leading the school-based curriculum.

5.2.6 Innovation

I realized that there is a process by which the Curriculum Coordinator innovated the school-based curriculum. She learned from the experts and contextualized their materials as a school-based curriculum. The successful experience of one specific subject may even become transferable knowledge to other subjects when developing a subject-based curriculum.

5.2.6.1 *New item - Contextualizing creativity*

Contextualizing creativity means that the entrepreneurial teacher successfully combined expertise and experience in the school context to develop the creative curriculum for addressing the school's primary concerns. Since the establishment of a rigorous reviewing system, the Curriculum Coordinator has identified room for improvement in the curriculum.

‘We are very systematic. By reviewing the school performance, we focus on students’ learning and figure out the solution.’ (Subject coordinator A)

‘In addressing the problem, we seek for expert assistance. Honestly, we only gain ideas from them. They may not be that relevant... It finally becomes our school-based material.’ (Curriculum development coordinator)

The Curriculum Coordinator has a strategic resources plan to gain ideas from experts in every subject reform. She understood that experts might not fully realize the effects in a school context. Therefore, she learned from their expertise and developed the curriculum with subject teachers by considering the school context. For instance, the English subject applied for EDB support in developing the subject-based curriculum. They reflected upon the effectiveness of expert suggestions in the seed project. In the past four years, they have revised the curriculum to fit in with students’ needs. Mathematics subject also shared the same experience. They integrated the service learning into a formal mathematics curriculum. Students not only develop knowledge of calculation but also consider the school and family background in serving the communities. These creative ideas were generated by teachers, who gain experience from expertise. The senior management concluded that the Curriculum Coordinator and her team contextualized expert ideas into a creative curriculum at school.

5.2.6.2 Scaling of innovation

The Curriculum Coordinator is dedicated to the scaling of innovation, which refers to the transfer of innovative ideas inside the school. As a leader, she closely monitors every subject-based curriculum development. This practice is beneficial to the scaling of innovation inside the school.

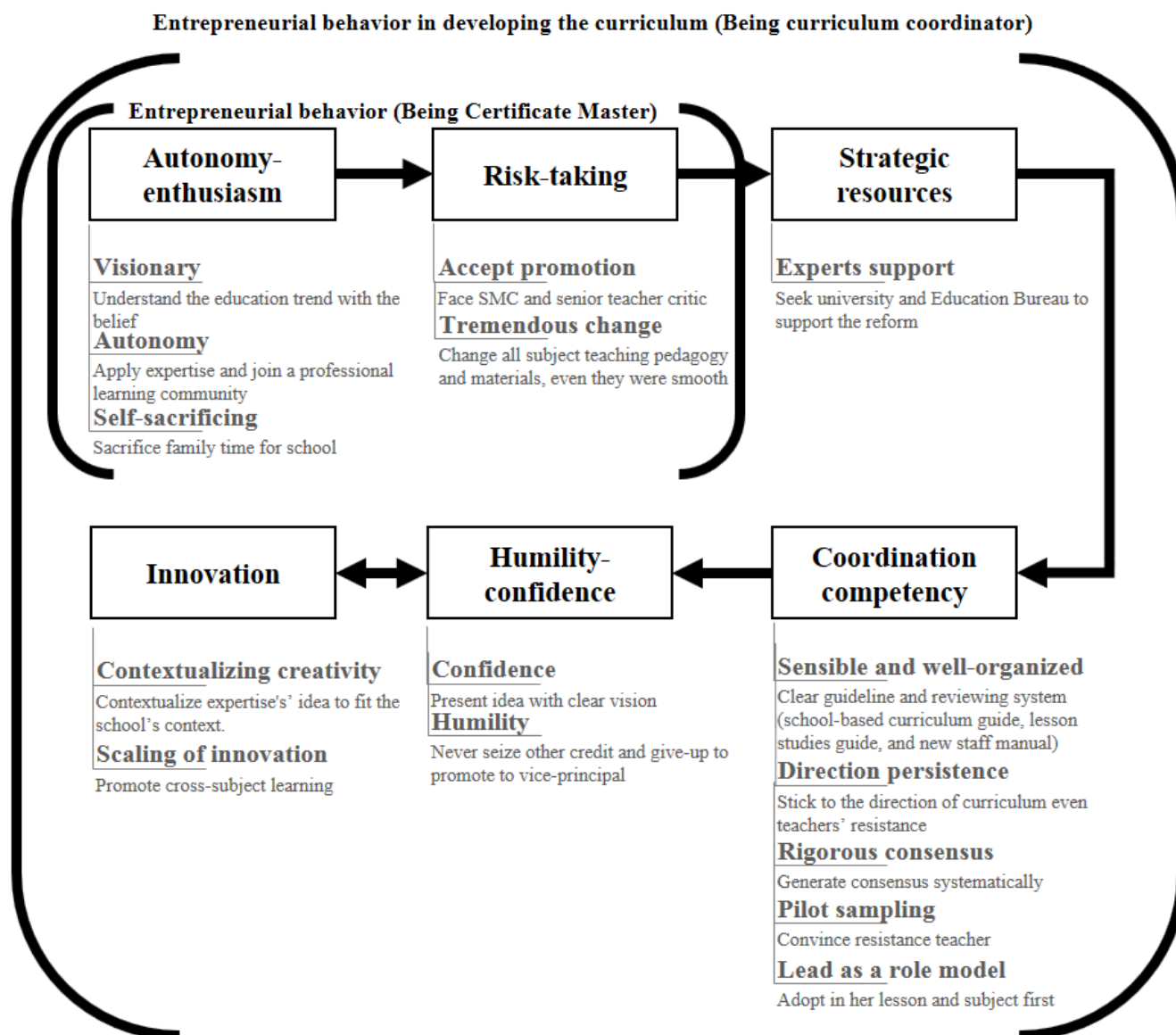
In the regular and matrix subject operation system, she generated a creative idea for developing the subject-based curriculum and addressing students’ needs. Subject coordinators needed to share their ideas and reform processes with other subjects. According to the sequence of subject-based curriculum reform, there was a scaling of innovation among subjects. The first subject-based curriculum took place in the General

studies and Chinese subject. Then, the Curriculum Coordinator shared their innovative ideas and practice to the English and Mathematics subjects. With the support of the rigorous operation system, the English department imitated and contextualized the ideas to fit into their subject. The mathematics department also experienced the same process. As subject coordinators explained, the Curriculum Development Coordinator led these reforms and transferred the ideas to subject teachers.

5.2.7 Summary for performing entrepreneurial behavior as a leader

To conclude, the Curriculum Coordinator demonstrates her entrepreneurial behavior by an individual working attitude towards leading the school-based curriculum. Figure 5.2 illustrates TEB in leading the school-based curriculum. In the process of curriculum reform, she became a sophisticated and humble leader. The findings are similar to case one with further description of TEB. In general, I identified six TEB from her. When she was a subject teacher, she demonstrated autonomy-enthusiasm in teaching and learning. This case further elaborates on case one's subject coordinator in that the vision/goal of education is a strong motive for taking the initiative. She also demonstrated the risk-taking behavior in the promotion of strategic resources for preparing the school-based curriculum. Although she lacked leadership experience, she endured the drawback of teacher resistance and sought consensus from teachers through performing her systematic leadership style. Nowadays, she is a humility-confidence leader who promotes an innovative school-based curriculum at school.

Figure 5.2 TEB in leading school-based curriculum



5.3 Impact of TEB

The Curriculum Coordinator performed entrepreneurial behavior in developing the school-based curriculum. The findings of this case is similar to case one that her impact covers all teachers and students directly and indirectly. In this section, I analyze the findings from teachers and students.

5.3.1 Enhancing teachers' performance

I reviewed the school report and students' assignments at school. I found that teachers are

systematic in managing students' assessment and their own teaching performance. According to the interview, teachers believe that the Curriculum Coordinator is the major reason behind ensuring teachers' performance.

5.3.1.1 Facilitating teacher working efficiency

The Curriculum Coordinator might enhance teacher working efficiency. As interviewees explained, she is good at coordinating colleagues to develop the subject-based curriculum. She closely monitored teacher performance in regular reviews and with the matrix subject operation system.

‘She is a serious person. Once you write any suggestion in your plan, she will check the process. ... If you work with her, you must be very careful to work hard to ensure the quality of your suggestions.’ (Subject coordinator C)

Teachers understand that she is a sensible and well-organized leader in monitoring teacher performance. Most of them perform their administrative and teaching duties in an efficient and effective manner in order to obtain a ‘pass’ in the Curriculum Coordinator’s inspection.

She also wants to enhance teacher efficiency through acquiring new teaching competencies. She organized relevant training or contacted experts to equip colleagues with new competencies for the new curriculum. Teachers acquired these competencies step by step, which promoted their efficiency in school-based curriculum implementation. For ensuring the adaptation of new teachers, she even developed a set of training manuals for them. In training, the mentor shared and provided support for new teachers. The Curriculum Coordinator ensured the mentor followed the guidance system for new teachers, which facilitated new teachers to perform their duties efficiently.

‘We have a mentorship program for new staff. We do not only share the teaching and learning strategies, but we also have lesson observations and a teacher guide for them to follow. All subjects employ the same practice.’

(Subject coordinator A)

When I reviewed the department reports and students' assignments in the research site, subject teachers could provide me with the materials immediately. I asked interviewees about the reason of this efficient response. They said that they already have an efficient reviewing system which makes it possible to provide all materials on demand. Most teachers have a clear concept of the school-based curriculum as well. This is a vivid example of teachers working efficiency.

5.3.1.2 Fostering teachers' coherence

The Curriculum Coordinator tends to enhance teachers' coherence at school. She decided the direction of the school-based curriculum for all subject teachers with the consent of subject coordinators. Although the direction was fixed, she collected teachers' feedback through the matrix subject operation system.

'We felt comfortable. She accepted our suggestions. Our ideas were a part of the curriculum. They listen to them.' (Subject coordinator D)

Teachers had the opportunity to voice their concerns in developing the curriculum. They were not only the executors but also played an essential role as contributors. They found a sense of ownership in the school-based curriculum.

'They (Teachers) have high job satisfaction in implementing the school-based curriculum. They found that their contributions promoted students' learning.' (Curriculum development coordinator)

'They (Teachers) are the team. They know their position and their contributions are honored.' (Principal)

'Some resistant colleagues finally worked with them. They found that everyone tried to do it. They don't want to be left behind.' (Subject coordinator C)

Teachers, who contributed their ideas to the new curriculum, enjoyed high job satisfaction as team members. Teachers are dedicated to performing their duties efficiently because they have a sense of ownership in the rigorous monitoring system. This coherence and efficient working relationship mobilized resistant teachers to participate in developing the new curriculum. Therefore, the Curriculum Coordinator mentioned many times that all teachers are a team, which implements the school-based curriculum together.

5.3.1.3 Promoting organization learning

The Curriculum Coordinator is concerned about teacher professional development, which may promote the organization of learning at school. Figure 5.3 illustrated how the entrepreneurial teacher design teacher professional development strategies. These are the regular professional learning activities that took place at school. I found that there are two major strategies influencing teacher development. First, she has a network with others school through the teacher professional learning communities. She invited subject coordinators to join the workshops and sharing sessions provided by the community for developing the curriculum.

‘I went to the meeting and sharing with her (Curriculum development coordinator). This is an intangible learning platform. I know how to implement new ideas at school. This is my personal professional development.’ (Subject coordinator B)

Second, most subject coordinators shared the same experience in the professional learning communities. They found professional growth in leading a subject curriculum reform. Her network benefitted the subject coordinators.

‘She found some other schools teachers to share with us... Just like STEM. She sent me to the workshop. Then, we had a subject-based sharing.’
(Subject coordinator D)

She also invited the experienced school to work with subject teachers in developing the

new curriculum. When there was a training course connecting schools' curriculum development, she might invite teachers to join the workshop and conduct a subject-based sharing. She ensured that all subject teachers had relevant knowledge for implementing the new curriculum.

Most importantly, the Curriculum Coordinator designed the school-based internal sharing system for enhancing organizational learning. She aimed at recognizing successful teaching experience and centralizing teacher professional development. In recognizing successful teaching experience, the Principal and Curriculum Development Coordinator wanted to take the opportunity to honor teachers, who participated and contributed to the school-based curriculum. They also wanted to encourage the strong sharing culture inside the school. For centralizing teacher professional development, the system allowed teachers to generate innovative ideas in teaching and learning and to understand the education trends.

‘Recently, we promoted lesson study as the basis for school-based curriculum. She strategically decided the theme of the sharing session.’
(Subject coordinator B)

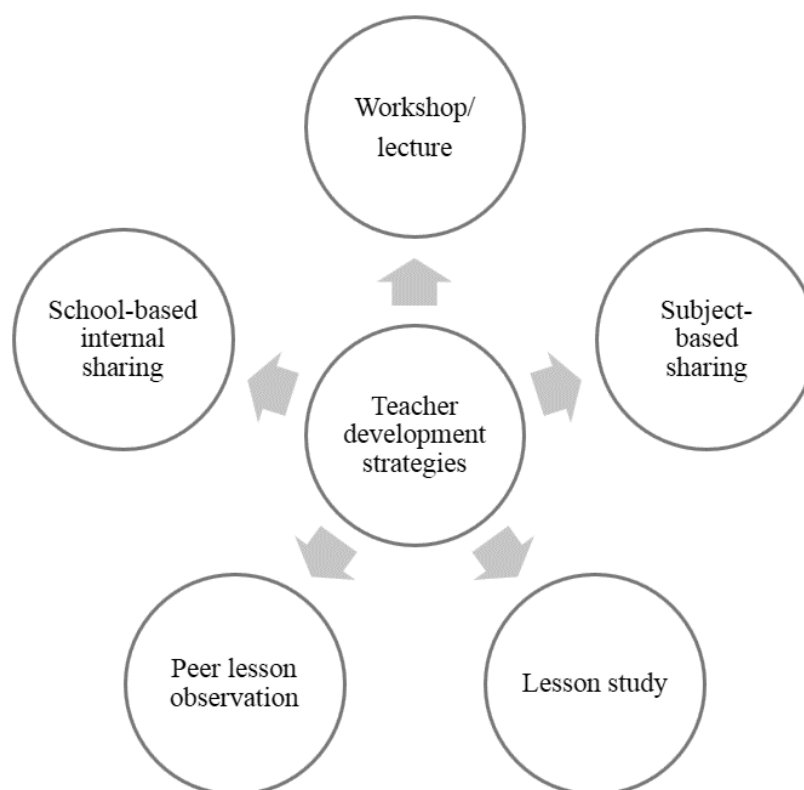
‘We do it (Sharing) three times a year. I have to say. It is not a research study. However, our colleagues shared their study results with colleagues. They knew the trends of reform and recognized their outstanding performance.’
(Subject coordinator C)

‘That’s good for my professional development. By reviewing their experience, I know that this may afford opportunities to integrate into my subject. I also gained some administrative ideas from their past experience.’
(Subject coordinator D)

As the Principal and the Curriculum Coordinator said, with the blueprint of the school-based curriculum, she had a clear direction for developing teachers. She decided the theme of the school-based internal sharing, which was the major concern for curriculum development in the academic year. There were three sessions each year. In the sharing sessions, teachers shared their implementation process and results to all teachers. Teachers

found that this sharing promoted their understanding of the current education trends and the practical strategies of executing curriculum reform at school. These authentic and contextualized sharing helped teachers to reflect on the possibility of transferring these successful strategies to their subject. Participants stated that teachers cherish the sharing sessions as school-based professional development. They are willing to share their work and stimulate colleagues thinking in teaching and learning.

Figure 5.3 Teacher professional development strategies



5.3.1.4 Reflecting teaching performance in reviewing and sharing

The Curriculum Coordinator triggers teacher reflection on their teaching and learning of the school-based curriculum. She actively reviewed teachers' performance by emphasizing reflection. Teachers responded that self-reflection enhances their teaching and learning performance. As section 5.3.1.3 mentioned, teachers reflect on how to integrate other subjects' successful experience into their own subjects. This is cross-subject stimulation in developing school-based curriculum. One point which was pivotal is that the presenters also gain an opportunity to reflect upon their teaching and learning in the school-based curriculum during the preparation.

‘Colleagues gain a lot in the sharing. They need to prepare for the presentation systematically. In the preparation process, they may reflect upon the effects of implementing the subject-based curriculum. They also explored the new way to handle the difficulties or modified their teaching.’

(Subject coordinator A)

‘They have confidence now. They are willing to try new things in teaching after the sharing.’ (Subject coordinator D)

Teachers, who presented the subject-based curriculum in the sharing session, needed to review the process of implementation. They were required to reflect on the core value of the subject-based curriculum. When they reflected the learning outcome of the curriculum, they connected the subject curriculum to the school development direction. This practice ensured subject-based curriculum links with the school-based curriculum. Moreover, teachers would have high confidence in teaching and learning, because all teachers recognized their successful curriculum in the sharing session.

In addition, the Curriculum Coordinator also trigger teacher reflection in the implementation process. In the matrix subject operation system, she discussed the subject development plan with the subject coordinator. She respected the subject-based decision. The subject coordinator had the authority to adjust the plan if needed. For some new teaching and learning strategies, she even developed and worked with subject teachers. She emphasizes colleagues’ professional judgment in designing the curriculum, while she has a closer look at their work.

‘She monitored the implementation process with us... When I reviewed the process, we found that we already consider how students acquire knowledge in this topic. We also reflected on how to cater to students’ needs.’ (Subject coordinator A)

‘In our system, she reviewed the curriculum with the subject coordinator. We keep on modifying. Simplifying the trivial tasks and adding more self-directed learning (School-based curriculum direction) into the teaching.’

(Subject coordinator C)

Colleagues responded that her leadership style and sophisticated attributes forces them to reflect upon their teaching and learning in the subject-based curriculum. They reflect upon the design of teaching strategies and the reliability of sources of materials. They also modify their teaching materials and strategies to fit the core direction of the school-based curriculum and students' needs. The Curriculum Coordinator promotes a spiral reflection for the teachers in the implementation process. These reflections enhance teacher teaching and learning performance.

5.3.2 Nurturing students' growth

To preserve the privacy of students, I studied the students' assignments and performance at school. The lesson observation data and most students' work cannot present in this thesis. However, what did I found to support the participants' feedback that the school-based curriculum aimed at promoting students' academic performance, positive attitude and life skills. Entrepreneurial teachers advocated the curriculum reform and develop a new teaching content with teachers. This curriculum is a condition that might foster students' growth.

5.3.2.1 Enhancing students' academic performance

The primary aims of promoting the school-based curriculum were catering for students' learning diversity and advancing their academic performance. According to interviewee responses and my observation, teachers perceived that the school-based curriculum creates conditions which enhance students' academic performance though catering for learning diversity and reading to learn.

There are many parents and students who apply for this traditional and prestigious school. The competition creates a rivalry among students. Teachers found that there was a labeling effect on students, who studied in a lower performance class. The problem of learning diversity was serious in the school.

‘Teachers know their students’ needs. The method we used to employ was not bad... However, we needed to integrate some strategies for catering to learning diversity into our teaching. We aimed at helping them to overcome their difficulties.’ (Subject coordinator C)

‘We integrated self-directed learning into the learning process. ... These skills are not only applicable to the specific subject. They can apply to every subject.’ (Subject coordinator A)

The Curriculum Coordinator decided to integrate self-directed learning into the curriculum. Teachers not only taught the subject knowledge to students but also shared study skills with them. According to the assignment inspection, I found that students were required to do a preview before the lesson and collect the relevant materials for the lesson. There was a peer assessment for every assignment, which promoted students to learn from their peers. Based on the peer assessment, teachers would provide a personal suggestion for the student. Students would see the strategies for enhancing their learning performance from a different perspective. The learning process contained self-directed learning and teacher’s facilitation. Students were active learners, while teachers were the facilitators of catering for learning diversity.

Furthermore, the Curriculum Coordinator promotes reading to learn for enhancing students writing skills. In the school-based curriculum, teachers emphasized the connection between reading and writing. They integrated the self-directed learning strategies in reading to learn. Students were required to select the reading materials on their own as well. Teachers also chose conventional reading materials for each topic. The library also worked with subject teachers to promote the reading habit for students.

‘We employ various strategies to promote reading to learn for writing now... They are so lucky that we prepare materials for them. They find the relevant reading. Then, we go through the materials and produce the final product with them.’ (Subject coordinator B)

It is the responsibility of teachers to become facilitators to demonstrate the skills of connecting reading to writing. According to the lesson observation in Chinese and English lesson, they use the reading material as an input for students to understand grammar, structure, and vocabulary. I studied their school-based curriculum materials and students' assignment at school, I realized that teachers employ scaffolding strategies to construct comprehensive writing with students. Figure 5.4, the only students' work I can present with the school's permission, shows some samples of students' work, which illustrate the process of constructing writing with teacher guidance. As interviewees explained, students have shown a great improvement in writing. With regard to the assignment inspection, I reviewed high, middle, and low achievers' assignments from primary one to primary six students. We found that students showed improvement throughout the year. All students were able to write a structured passage in their assessment.

Figure 5.4 Process of constructing comprehensive writing with teachers' guidance

Day: Monday **Date:** 5 October 2017
N. Grammar - Basic Sentence Structure

What is a sentence?
 A sentence is a group of words that you use to say something. It must have a subject and a verb, but it may or may not have an object.

Sentence

Subject (S.) Verb (V.) Others (O.)

Exercise:
 In the following sentences, draw a rectangle (□) for the subject (S.), a triangle (△) for the verb (V.) and a circle (○) for others (O.).

(S.) (V.) (O.)
 e.g. I am a girl.

- My name is Mary.
- I am nine years old.
- My father works in a clinic.
- Miss Chan teaches me English.

22

Day: Wednesday **Date:** 25th September 2017
Text type - Personal Description
 O. Polly is introducing herself now. Read it.

Paragraph 1 (Personal information):

- Name
- Date of birth
- Appearance

My name is Polly Chan. I am eight years old. I was born on 25th June, 2005. I am 120 cm tall. I weigh 45 kg. I am short and fat. I have two big eyes and a small mouth.

Paragraph 2 (About my family):

- Live with
- No. of brother(s) / sister(s)
- Father's job
- Father's character
- Mother's job
- Mother's character

I live in Causeway Bay with my father and my mother. I have no brothers or sisters. My father is a taxi driver. He is hard-working. My mother is a housewife. She is kind. She always looks after me. My telephone number is 2451-2123.

Paragraph 3 (About my school):

- Ways to go to school
- Favourite subject and reason

I study at St. Francis' Concession School. I go to school by school bus. I am in Class 3A. My class number is five. My favourite subject is Music because I love singing songs. I love my school very much.

Writing tip:

- Simple Present Tense
- S.V.O.

23

P. Class Writing

Day: Wednesday Date: 25th September, 2013

Write about your NET teacher, Miss Sophie.
Part 1: Fill in the mind map.

Personal Information (1)

- Name: Miss Sophie
- Age: 34
- Date of birth: 13th February, 1979
- Height: 167 cm
- Weight: 60 kg
- Appearance: blond hair

My New NET Teacher

About her family (2)

- Live in: Discovery Bay
- Live with: Pejman
- No. of brother(s) / sister(s): no brothers or sisters
- Father's job: transportation
- His Character: strong & handy
- Mother's job: shop attendant
- Her Character: friendly & patient
- Telephone No.: ?

About her school (3)

- School's Name: St. Francis' Canossian School
- Ways to school: bus -> ferry -> bus
- Classes she teaches: 2A, 2B, 2C & 2D
- Favourite subject: Speaking
- Good at: cooking

Day: Wednesday Date: 25th September, 2013

Part 2: Use the mind map and write about your new NET teacher in about 60 words or more in 3 paragraphs.

Our New NET Teacher - Miss Sophie ~
by Class 3A

Our new NET teacher is Miss Sophie. She is 34 years old. She was born on 13th February, 1979. She is 167 cm tall. She weighs 60 kg. She has blond hair. She is tall and she has big eyes.

Miss Sophie lives in Discovery Bay with her boy friend Pejman. She has no brothers or sisters. Her father is strong and handy. Her mum is friendly and patient.

Miss Sophie teaches in St. Francis' Canossian School. She goes to school by bus and ferry. She teaches Class 2A, 2B, 2C and 2D. She loves speaking very much. She is good at cooking. We like her very much.

5.3.2.2 Nurturing students' positive attitude and life skills

When the Curriculum Coordinator designed the school-based curriculum, she wanted to nurture students' positive attitude and life skills as well as their academic achievement. Although every subject considered students' attitudes and skills in developing the materials, they realized that there was a need to illustrate the evidence. They developed an interdisciplinary integration curriculum for students, which is theme-based learning. They even combined the service learning into the theme-based curriculum. Students needed to use their knowledge of various subjects, life skills and positive attitude in the learning process. For instance, primary one students learned self-management and the traditional school culture, which was related to life skills and a sense of belonging to the school. Primary two students explored the community they live in. They needed to brainstorm an idea to serve the public.

'When our students advance to the secondary school, they share their learning experience. Many of them said that the things they learned about life skills and a positive attitude are relevant to their studies now.'



(Curriculum development coordinator)

‘Compared with the past, students are not shy. They have strong confidence now.’ (Subject coordinator A)

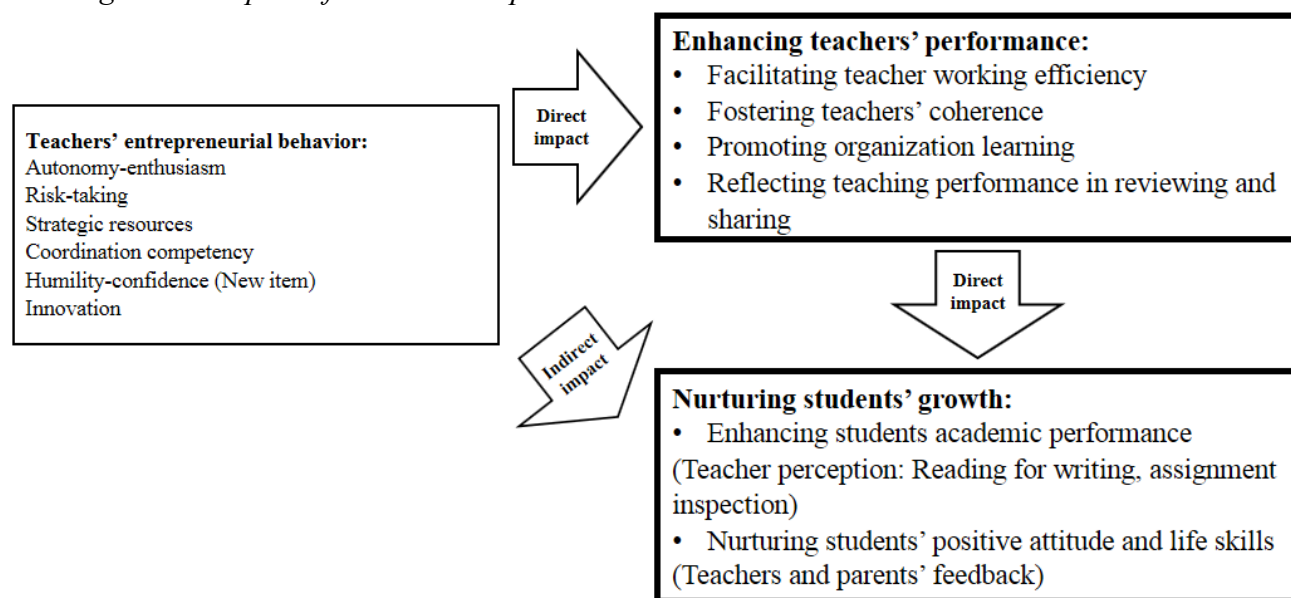
‘Our parents are so supportive. When I meet them at school, they appreciate the curriculum of nurturing life-skills.’ (Principal)

Positive attitude and life skills are difficult to measure. I identified the impact from interviewees, lesson observation and school documents. I check the implementation of the new curriculum in the lesson observation and students work. According to the interviewees’ observation and my observation, students nurtured a sense of responsibility and life skills. Students became more confident in presenting their ideas and managing themselves in class. For the attitude and life skills, I can only observe the delivery in the lesson. However, teachers’ explained that they are also good at organizing activities on their own. Parents’ feedback on students’ attitude and life skills is positive as well. Although these claims might not be proofed by any evidence, teachers believed that the Curriculum Coordinator advocated an important initiative at school. She worked with teachers that help students to form a positive attitude and acquire life skill in the new curriculum. This is an indirect impact of TEB.

5.3.3 Summary of the impact of TEB

The purpose of the school-based curriculum was to enhance students’ academic knowledge, attitude, and skills. In order to ensure the quality of the curriculum, the Curriculum Coordinator decided to promote teacher professional development. Figure 5.5 indicates the impact of teacher entrepreneurial behavior. With the support of the rigorous school management system, her entrepreneurial behavior has a direct impact on teacher development and teaching performance. Teachers, who developed the curriculum with the coordinator, created learning conditions to nurture students’ growth in academic knowledge, attitudes, and life skills. TEB influenced the quality of the conditions while teachers were in the front line of nurturing students’ academic and personal growth. These findings are similar to case one, but participants have not stated any impact of the school branding this time.

Figure 5.5 Impact of teacher entrepreneurial behavior



5.4 The Conditions for Enhancing TEB

The Principal and teachers have a tied relationship in this school. All teachers have served in this school over 20 years since graduation. With the Principal's leadership, they have constructed a rigorous management system, which is the foundation to support the entrepreneurial teacher's school-based curriculum. Most importantly, the Principal also has a close relationship with the entrepreneurial teacher. She has a positive influence on the entrepreneurial teacher's behavior. Therefore, I analyze the Principal's leadership first. Then, I analyze how school culture and the communication network enhance the entrepreneurial teachers' behavior in developing the school-based curriculum.

5.4.1 Principal leadership

The Principal has served in this traditional school for over 30 years. She was promoted to the principal in 2003. At that time, there was an education reform from the EDB. She took the initiative to promote a comprehensive school review of curriculum development and teacher deployment. As an initiator of school changes, she has a significant influence on the Curriculum Coordinator's entrepreneurial behavior.

5.4.1.1 Directional persistence

As a long-serving employee, a sense of responsibility drives the Principal to formulate the

direction of school development. Her direction is the beacon for teachers, which inspires and supports the Curriculum Coordinator to reflect her professionalism.

‘The former principal established a strong foundation (Schools development) for me. I cannot stop. There is a connection between the school and me. I have to ensure the sustainability of the school and nurture our students.’
(Principal)

To identify the development direction for nurturing students, she sought expert advice from the EDB and university in order to understand the trend of education reform. She also conducted the school self-evaluation, in which their school was the pioneer, for locating school needs. They finally decided to conduct a curriculum reform for facilitating students’ whole person development. The curriculum reform became the paramount direction for leading her school.

Some examples demonstrate how the Principal is persistent in the direction of school development. As a leader, she understands the necessity of providing teacher professional development. Therefore, she provided training for teachers which was aligned with the curriculum reform. She set a performance standard for teachers which is the goal for teacher professional development in fulfilling curriculum reform. If teachers do not meet the performance standard or show reluctance to the reforms, she will ask them to leave the school.

The Curriculum Coordinator explained that the Principal’s directional persistence inspires her to systematically follow the direction of development for the school-based curriculum. She learned how to understand the trend of education development and identify the school’s needs by using the review system. When she explored the direction of the school-based curriculum, she also adopted the same approach. Then, she developed teachers to meet her target.

5.4.1.2 Systematic opportunity identification

The Principal identifies the opportunity of all reforms systematically, which became a motive for the Curriculum Coordinator to actualize the school-based curriculum. The Principal realized that the teachers' resistance was an obstacle to the Curriculum Coordinator in promoting the school-based curriculum. Coincidentally, the EDB also advocated several education reforms, school self-evaluation, external school review, and curriculum development, in the education sector. She identified that these reforms were the motivation for advocating school-based curriculum reform.

'I got a call from EDB. They wanted to conduct the comprehensive review at our school. The sister gave me permission to turn down the invitation. However, I decided to take it. It was an opportunity for me to understand our school's strengths and weaknesses. That is a good idea. I can relocate and develop my school curriculum.' (Principal)

From her point of view, the education reform was an opportunity for reviewing school performance and promoting school reform. She conducted the school self-evaluation and external school review to locate school weaknesses. She also employed a knowledge management system for interpreting and storing the evaluation indicator. Based on the performance indicator, she convinced teachers to focus on students' whole person development and cross-subject coordination. She also reviewed the indicator to design the direction of teacher professional development. Teachers followed the performance indicator to agree to the school-based curriculum and acquire relevant competencies. The process of identifying the opportunity was systematic, which generated convincing evidence for teachers to develop and enhance the school curriculum.

The Curriculum Coordinator was in-charge of exploring these data. She got first-hand information to conceptualize the needs of promoting a school-based curriculum. She found that the Principal's systematic opportunity identification process allowed her to convince teachers to participate in developing the school-based curriculum using the convincing evidence.

5.4.1.3 Empowerment coach and Rigorous monitor

The Principal is the mentor to the Curriculum Coordinator providing administrative support, personal guidance, and professional development. When the Principal agreed with the direction of school reform as curriculum reform, she was looking for a capable teacher to be in-charge. The Curriculum Coordinator was promoted from a Certificate Master level teacher to the Curriculum Coordinator.

‘She (Principal) asked me about the promotion. I still remember that. It was a risky decision for her. I am just a CM. I was so nervous, I had no administration experience.’ (Curriculum development coordinator)

‘I don’t care who you are. I am looking for the ones who are willing to serve. You have no experience? That’s fine for me. It can be trained. I need someone who is enthusiastic about education.’ (Principal)

The promotion of the Curriculum Coordinator was a risky decision for the Principal. The school management committee was also concerned about the ability of the Curriculum Development Coordinator. However, the Principal understands the importance of delegating authority and responsibility to capable teachers. She believed that the coordinator has good intentions and is enthusiastic about teaching and learning. Furthermore, they shared the same vision in promoting curriculum reform. As an experienced former Vice-Principal, the Principal decided to work with the Curriculum Coordinator by sharing her precious administration experience.

‘She was with me. She never doubts my decisions and empowers me. She worked with me and witnessed my personal growth.’ (Curriculum development coordinator)

‘We work together. We are like a pair of swords. Whatever the administration and personal relationship, we are the perfect match.’ (Principal)

At the beginning of the reform, the Curriculum Coordinator faced various challenges in

teacher relationships. The Principal sat in all department and committee meetings to monitor the working process of the curriculum development. When there was an argument between the Curriculum Coordinator and subject teachers, the Principal played the role of moderator. Being a mentor, she only shared her experience in order that the Curriculum Coordinator could learn to understand how to work with subject coordinators. At the same time, she offered her a high level of autonomy for designing the curriculum. Even though she participated in all meetings; she minimized her interventions. While teachers enjoy high autonomy in performing their duties, the Principal looks closely at the reform process.

Because curriculum reform was a new concept for the Curriculum Coordinator and the Principal, they explored the professional development training and resources together. The Principal recognized the importance of professional development for teachers. When there was relevant training, she invited the senior teachers to participate in the training workshops. The Principal led as a role model, and she also gave constant personal support in the training workshops. However, she was one of the trainees in understanding the process of promoting school curriculum reform.

‘There was training for six weeks. In fact, it was not necessary for her to be with us. Most schools only sent their subject coordinators to attend the training. However, our Principal attended all sessions. She is very supportive in teacher professional development.’ (Vice-principal)

The Principal not only empowered the potential teachers to be in-charge of the curriculum but also gave administrative support and personal guidance in teacher professional development. They have a coaching relationship.

The Principal has a clear direction for school curriculum reform and in leading her school. To connect with this direction, she utilized systematic evaluation to review school performance and promote school reform. In developing the curriculum, the Principal empowered and coached the teachers’ in-charge by employing a rigorous monitoring approach. I found that the Principal’s engagement was high, but she minimized the

intervention as a participant. The Curriculum Coordinator acquired the skills of formalizing the direction, systematic management style, and working with teachers, from the Principal. She has a strong impact on the Curriculum Coordinator that Curriculum Coordinator claimed the Principal enhances and nurtures her TEB, especially the coordination competency.

5.4.2 School culture

The Principal's leadership has a direct impact on the school culture, which is beneficial to the TEB. I found that teachers are willing to contribute their ideas in a rigorous working environment with the open working culture. This culture helps the Curriculum Coordinator to modify and complete her school-based curriculum efficiently and effectively.

5.4.2.1 Rigorous working manner

The Principal is a systematic leader. She checks teachers' plan and reports regularly with a rigorous review system. She believes that a rigorous operation and review system is the only way to ensure quality education. All teachers understand the needs of fulfilling her requirements. Therefore, teachers perform all tasks on time with data analysis. I call this practice 'the rigorous working manner', which also benefits the entrepreneurial teacher to perform her entrepreneurial behavior in developing the school-based curriculum.

The rigorous working manner can be simply spotted by me in the research field. I reviewed the school plans and reports, subject plans and reports, and the students' work. All materials were presented systematically. According to most teachers' response, the former and present principal were systematic people who formalized a rigorous working manner at school. Furthermore, the school management system has become much more comprehensive since the introduction of school self-evaluation.

'Our school has a self-evaluation committee. We decided the three-year plan, staff development, and administration, etc. According to past performance, we identified major concerns and shared them with the subject department. There is a different level to fulfill the major concerns.' (Subject coordinator

B)

They also constructed a comprehensive procedure to review the school and subject performance which became the blueprint for developing the major concerns for school and subject. During the academic year, the Principal and teachers review the process regularly. As previously mentioned, the Principal did not only go through the document but also attended all meetings like a coach. The serious review process is an evidential signal for teachers to perform their duties earnestly. The entrepreneurial teacher stated that teachers are well-trained for any reform. This facilitated her in promoting the school-based curriculum at the beginning.

In addition, the matrix subject operation system is the primary driver to facilitate the penetration of the school-based curriculum. In monitoring and reporting the implementation of the school-based curriculum, various subjects can cross-check the process by attending the meeting and reviewing the report.

‘I like to read the report in table format. It saves time for me to understand cross-subject implementation. ... Through reading their report and meeting, we can trace back the subject work.’ (Curriculum development coordinator)

‘Our culture is hardworking. No one takes a break. You can see that colleagues are busy in marking, teaching and so on. We are watching each other.’ (Subject coordinator B)

The rigorous monitoring system may motivate teachers to take things seriously and circumspectly. Most teachers were devoted to performing their duty and adopting the new school-based curriculum. According to my observation, the quality of their work, such as marking, reports, and even display boards, was high and unified. The rigorous working manner is the fundamental culture in this school.

When the Curriculum Coordinator led teachers to develop and implement the school-based curriculum, teachers had already formed a rigorous working manner in planning,



organizing, and evaluating the result. They implemented and reported their experiment of the school-based curriculum efficiently and effectively with data analysis, which prompted the Curriculum Coordinator to modify and actualize the school-based curriculum.

5.4.2.2 Embedding a trusting and open culture

The trusting and open culture in this school helps the Curriculum Coordinator to generate ideas and decide the direction of the curriculum. Two major elements formed the trusting and open culture - collecting constructive opinion and facilitating teachers' development. With regard to collecting constructive opinion, the purpose of formalizing the school self-evaluation and matrix subject operation system is to enhance the communication and generate innovative pedagogical strategies.

‘In the past ten years, I delegated my power to subject... Starting from the form coordinator level, I hope they can discuss and compromise.’ (Principal)

In the decision-making process, the rigorous school system becomes a channel for the teacher to voice their concerns about school policy and curriculum development. For instance, the school uses a rigorous system to collect teachers' opinions in deciding the school mission and vision. The Curriculum Coordinator stated that they appreciate teachers' participation. When teachers' suggestions do not violate the rationale of the reform, the school authority offers high autonomy for teachers. In some cases, teachers may even reject the Principal and Curriculum Development Coordinator's decision. For example, the teacher was concerned about the applicability of assessing students' performance. As a result, there were three trial sessions in project learning. The reason behind the acceptance is that senior management valued teachers' constructive opinion in implementation because they are the executors of the reform.

Furthermore, the Principal formed an open culture in order to facilitate teachers' development. There is a subject-based and school-based sharing session, which will further evaluate and explain the mechanism in the next section. The Curriculum Development Coordinator promoted this sharing session so that teachers would be willing to share their

successful experiences in curriculum planning and development.

‘Our colleagues gain ideas from another subject... They are so happy about that. They can share and learn from others.’ (Subject coordinator A)

Teachers gained experience and insight from colleagues, they cherish the open and sharing culture at school, which has become the general practice for school operation.

In short, the rigorous working manner and embedding a trusting and open culture allowed the Curriculum Coordinator to gain support from teachers. The rigorous working manner promotes a serious working attitude amongst teachers, while the Curriculum Coordinator can collect constructive opinion through this rigorous school system. Moreover, teachers are trained to share their ideas and insights into the curriculum development. The rigorous working manner does not only contribute to the quality of teachers’ work but also enables an open and sharing culture among teachers. The Curriculum Coordinator has a highly capable team to develop the school-based curriculum. She also generates ideas from teachers through the regular review system and matrix subject operation system.

5.4.3 Communication network

I realized that there are two types of communication network in this school - network expansion inside and outside the school. These networks promote the Curriculum Coordinator’s TEB in leading the school-based curriculum.

5.4.3.1 Network expansion inside school

Network expansion serves as a crucial element in promoting teacher participation in the school-based curriculum. The communication network inside school aims at monitoring the curriculum implementation and generating innovative pedagogical strategies. There are two network expansion strategies inside the school for fulfilling this purpose, matrix subject operation system and school-based internal sharing system. First, the matrix subject operation system emphasizes the regular meeting within the subject department and cross-subject coordinator cooperation. This system ensures that school messages can be delivered

to the front-line teachers, while their opinions can be reflected the Curriculum Coordinator. This system promotes the penetration of the school-based curriculum and the supervision of routine operations into each subject. Second, the school-based internal sharing system is the cross-subject and cross-level communication network for teachers. The Principal and the Curriculum Coordinator explained that they have to report the curriculum development to the school management committee every year. The report contains the special circumstances of every subject-based curriculum which consumes teachers' time in the preparation. The Curriculum Coordinator recognized that there is also an opportunity for teachers to share these materials with teachers of other subjects. Therefore, they conduct a school-based internal sharing system. Teachers, who have adopted innovative teaching and learning strategies, are invited to share their work with colleagues. This practice promotes the generation of innovative pedagogical strategies at school. Table 5.4 indicates that both network expansion strategies serve the purpose of generating innovative pedagogical strategies. While the matrix subject operation system is focusing on monitoring operations and generating ideas within the hierarchical structure, the school-based internal sharing system aims at expanding teachers' network across subjects and levels. The network expansion inside school eases the difficulties for the entrepreneurial teacher of managing various subjects at the same time. The network is the centralized system to oversee the whole process of developing a school-based curriculum and teacher professional development.

Table 5.4 Network expansion strategies inside school

	Purpose	Networking direction
Matrix subject operation system	<ul style="list-style-type: none"> Monitoring the curriculum implementation Generating innovative pedagogical strategies 	<ul style="list-style-type: none"> Top-down Bottom-up
School-based internal sharing system	<ul style="list-style-type: none"> Generating innovative pedagogical strategies 	<ul style="list-style-type: none"> Cross-subject Cross-level

5.4.3.2 Network expansion outside school

Network expansion outside school is the first step in developing the school-based curriculum. The purpose of the network expansion outside the school is to provide essential information for teachers to understand the education trends and updated pedagogy. The Principal's leadership has a direct impact on network expansion outside the school. As

section 5.4.2.3 mentioned, the Principal supported teacher development for promoting curriculum reform. She encouraged teachers to expand their network outside of the school and provided administrative support, such as development leave. At the beginning of fostering the school-based curriculum, teachers had no external network with the EDB and university. The Principal and the Curriculum Coordinator took the initiative of contacting the EDB and university experts to develop teachers' competencies and understanding of curriculum reform. This practice became the general practice for every subject-based curriculum reform.

'We applied for the EDB school-based support service. We have co-planning and discussion. They also shared some successful school experience with us. Their suggestions became the reference for us to develop the subject-curriculum. They would comment on it too.' (Subject coordinator A)

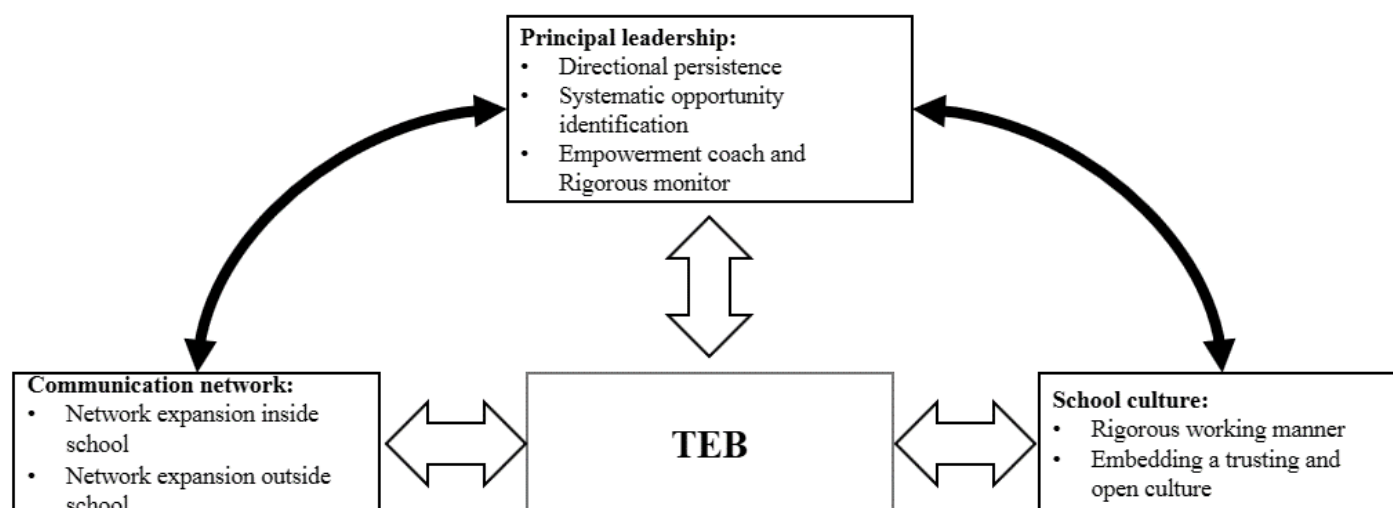
All core subject coordinators shared the same experience of the Principal and the Curriculum Coordinator supporting the network expansion outside the school for them. They gained ideas and experience from external parties, which became the foundation of the school-based or subject-based curriculum.

5.4.4 Summary of the conditions for enhancing TEB

The Principal's leadership significantly affects the conditions for enhancing TEB. Figure 5.6 illustrates the relationship among three conditions for enhancing TEB. I found that the Principal's leadership is directional and rigorous in planning, organizing, leading, and controlling. Her leadership style influences teachers' rigorous manner. Compared with case one, case two's Principal even has the rigorous management style. However, this style does not burden the openness among teachers. The Curriculum Coordinator and Principal constructed two communication networks, a matrix subject operation system, and a school-based internal sharing system, to facilitate the open culture of the school. The process of communication is also systematic and well-developed, which reflects their leadership style. The Principal's rigorous leadership established an active communication network and

cultivated a thorough and open culture in this school. These conditions provide a substantial foundation for the Curriculum Coordinator to develop the school-based curriculum.

Figure 5.6 Conditions for enhancing TEB



5.5 Conclusion

This chapter indicates that the Curriculum Coordinator has a significant impact on all subjects. She has a strong vision in conducting the school-based curriculum for nurturing students' growth. In order to fulfill her vision, she performed the entrepreneurial behavior to mobilize all subject teachers to reconstruct their subject-based curriculum. The difficulties of this curriculum were the unification of various subject-based curricula. She successfully unified all subject-based curricula into two major themes, gifted education and self-directed learning. She not only constructed a visible school-based curriculum but also promoted the scaling innovation at school. Each subject teacher acquired innovative ideas from other subjects, which promoted their subject curriculum reform.

In this case, there were three notable findings from the entrepreneurial teacher and the conditions. With regard to the entrepreneurial teacher, every teacher, the Principal and she herself perceived that she has a directional persistence of coordination competency in developing the school-based curriculum. She is a visionary coordinator who would employ all possible methods to fulfill her vision, once she recognized it. In developing the school-based curriculum, there was much resistance from senior teachers and some technical issues. She discussed with each of the teachers one by one and generated a consensus idea

with them. Her persistence motivated her to work with all teachers and constructed a unified whole-school-based curriculum. Furthermore, the innovation of the entrepreneurial teacher is about contextualizing creativity. She learns from outside and internalizes the materials. Based on the school and student needs, she contextualized the materials to be part of their innovative ideas. With regard to the conditions, the rigorous manner was the accelerator of enhancing the impact of TEB. The Curriculum Coordinator had a strong vision and plan in actualizing the school-based curriculum; she needed to work with all subject teachers. This is the most challenging task for cross-subject cooperation. The rigorous working environment offers a foundation for her to promote the school-based curriculum. Teachers are well-trained for handling teaching and learning systematically. The entrepreneurial teacher takes advantage of the teachers' rigorous manner to develop the school-based curriculum effectively.

Lastly, this case connects with case one finding, especially the humility-confidence with trust and principal leadership. The Curriculum Coordinator also shows the humility-confidence behavior in leading her committee. When she developed the subject-based curriculum with the subject coordinator, she had confidence in sharing her successful experience with colleagues. At the same time, she listened humbly to their concerns. Most importantly, she also honors teachers' contributions as the major reason for success. Every subject coordinator and teacher is glad to work with her because she is a promising and open-minded leader. They form a trusting relationship in developing the curriculum. The finding of humility-confidence is similar to the case one subject coordinator. On the other hand, this case also realized the importance of Principal leadership. In this case, the Principal has an even closer relationship with the entrepreneurial teacher - as a mentor. The entrepreneurial teacher learned the leadership skills and well-organized working style from the Principal. With the support of the Principal, the entrepreneurial teacher has an opportunity to perform her entrepreneurial behavior.

To conclude, this chapter describes the process of how an entrepreneurial teacher forms the school-based curriculum. Table 5.5 summarizes the findings of this chapter. I found that the Principal's leadership is the catalyst to mobilize the curriculum reform, which offered

a platform for the Curriculum Development Coordinator to perform her entrepreneurial behavior. In the curriculum development process, she utilizes the rigorous school management system to lead all subject teachers. They identified the direction of curriculum reform. She also improved her leadership skills with the Principal's guidance. The synergy of rigorous management and TEB enhances teacher performance in teaching and learning. As a result, they form a unified school-based innovative curriculum for their students.



Table 5.5 Responses to research questions

Research questions	Research niches	Findings	Summary
1. How do teachers and leaders understand and enact TEB and its components?	There is an insufficient understanding of the definition of TEB, it is valuable for me to explore this research niche in this study.	TEB: Autonomy-enthusiasm Risk-taking Strategic resources Coordination competency New items - Humility-Confidence Innovation	Significant of this chapter: - Professional development for promoting scaling innovation among subjects Special findings of this chapter: - Directional persistence for creating visionary curriculum - Contextualizing expertise materials for innovation - Rigorous system for constructing the foundation of the school-based curriculum
2. How do they perceive TEB's impact in schools?	Various meaning of impacts under the business and education context: 1. Diverse context between the business and education sector	Direct impact: - Enhancing teachers' performance Indirect impact: - Nurturing students' growth	
3. What school conditions enhance or challenge TEB?	Insufficient understanding of how conditions interact with TEB: 1. Lack of in-depth understanding of various conditions (e.g. Leadership style) 2. Needs of understanding the interactive relationship between schools' conditions and TEB	Principal leadership: - Directional persistence - Systematic opportunity identification - Empowerment coach and Rigorous monitor Organization culture: - Rigorous manner - Embedding trusting and open culture Communication network: - Network expansion inside school - Network expansion outside school	Connections with case one: - Humility-confidence also found for fostering trust among teachers - Principal leadership as mentor-mentee relationship



Chapter 6 – Case Three: Entrepreneurial Teachers as Innovation Facilitators

Purpose of this Chapter

This chapter reports on a team of entrepreneurial teachers who developed a school-based curriculum in a special school. First of all, I present the background information of the entrepreneurial teachers and how they promoted the school-based curriculum with their colleagues. Second, I state the findings on how entrepreneurial teachers performed the entrepreneurial behavior in leading the reform. Third, I interpret the impact of entrepreneurial behavior. Finally, I explain the conditions enhancing that behavior in the school.

6.1 Background Information of Entrepreneurial Teachers

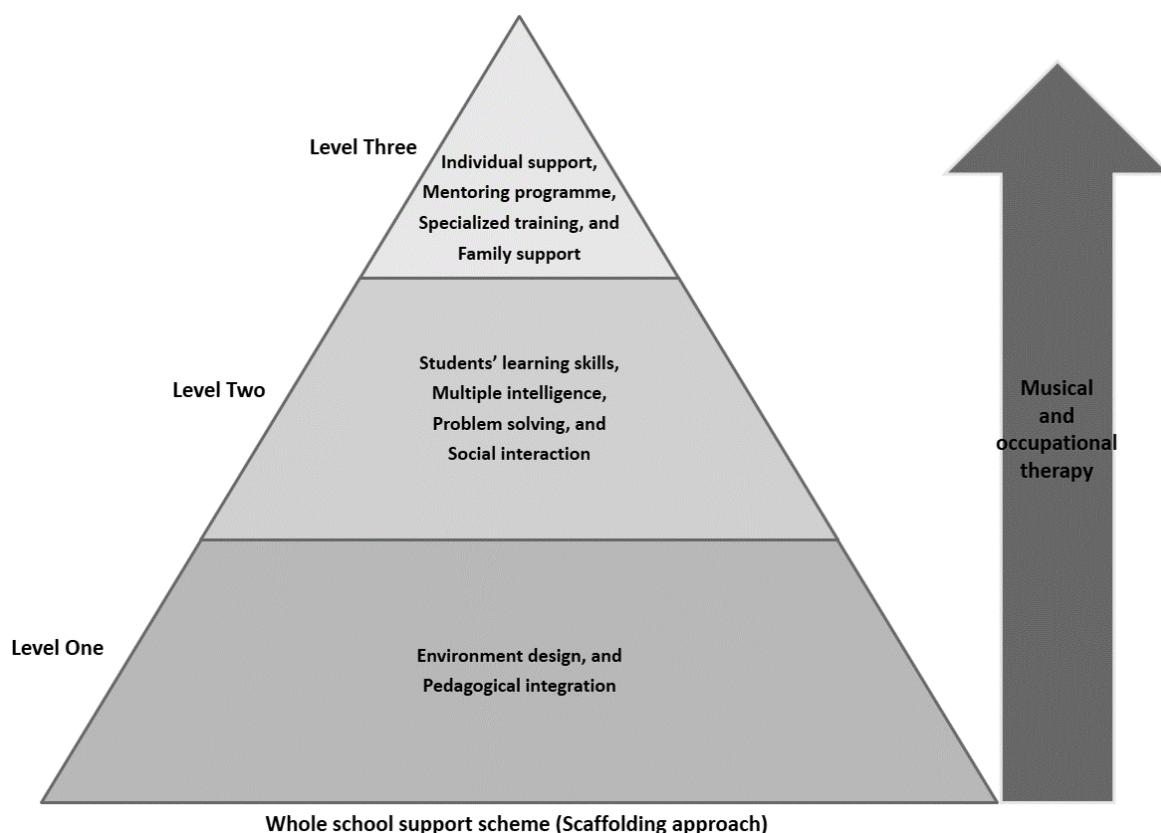
In this section, I present the reason for selecting these teachers as entrepreneurial teachers by describing their major achievement at school first. Then, I describe their role of being entrepreneurial teachers at the school in promoting their school-based curriculum. Third, I explain the context of this case to analyze TEB.

6.1.1 Selection of entrepreneurial teachers

The entrepreneurial teachers are the Vice-Principal and Subject Coordinator in a special needs school. In 2015, the Vice-Principal and Subject Coordinator were awarded the Chief Executive Teaching Award. They developed the school-based curriculum, named as ‘Whole School Supporting Scheme’. The reason for developing this scheme was that most students had autism with an intellectual impairment which meant that they needed guidance in communication, social development, and interest in activities. To equip students’ self-management and social skills, the entrepreneurial teachers developed a school-based curriculum (Whole School Supporting Scheme). There are three levels of the Whole School Supporting Scheme for students. In level one, there is pedagogical integration with musical and occupational therapy. At level two, group learning is initiated to develop students in four major areas learning skills, multiple intelligence, problem-solving, and social interaction. At level three, teachers emphasize catering for individual needs through individual support, a mentoring program, specialized training, and family support. Figure 6.1 illustrates the design of the Whole School Supporting Scheme. In this supporting

scheme, they employ the scaffolding approach by which teachers support students' development from generic skills to the individual specialisms. Each supporting level closely supports each other.

Figure 6.1 School-based curriculum (Whole School Supporting Scheme) (Source: School plan)



The Judges and I assessed the awarded school's report and marked the scores. Table 6.1 shows that the entrepreneurial teachers' school-based curriculum scores high marks for innovation and the ability to plan and manage a project. We agreed that the integration of therapy, information technology support and teaching was an innovative invention in pedagogy. These are cross-subject collaborations. Furthermore, the entrepreneurial teachers demonstrated high competency in leading the curriculum planning and mobilizing colleagues to perform in the curriculum as a whole school approach. Therefore, they score full marks in these two categories as entrepreneurial teachers.

Table 6.1 TEB score for case three

Judges	Innovation	Risk-taking	The ability to plan and manage a project	Autonomy with a positive attitude	Seeking external resources	Sub-total	Total
I	4	3	4	3	3	17	50
Judge A	4	3	4	3	2	16	
Judge B	4	3	4	3	3	17	

6.1.2 The story of entrepreneurial teachers

There are two entrepreneurial teachers in this case. They are the Vice-Principal and Subject Coordinator.

6.1.2.1 Vice-Principal (Expert in information technology)

The Vice-Principal is the coordinator of teacher professional development and quality assurance of the curriculum. Before joining the school, he was the information systems engineer in a corporate company. He analyzed data and developed the systems for different companies to enhance the efficiency of management. He joined this special needs school ten years previously. He was aware that teachers stuck to the traditional pedagogy. Moreover, teachers and the Principal continued to use paper to circulate and share information. As an expert in information systems, he decided to integrate information technology to facilitate teaching and administration work at the school. In the awarded school-based curriculum, he contributed to the information technology application and led colleagues to implement the curriculum.

6.1.2.2 Subject Coordinator

The Subject Coordinator is the principal coordinator of the school-based curriculum (Whole School Supporting Scheme). He was an occupational therapist who had served in a public hospital for seven years. He decided to shift his career path to the education system ten years earlier. That is the same background as the Vice-Principal. From his point of view, the pedagogy of teaching special needs students should be different from a traditional school. He emphasized learning for living. Teaching should be more practical and living related. He realized the disconnection between the school curriculum and real living practice. To address this issue, he teamed up with the Vice-Principal and some of the

teachers to modify the curriculum as the ‘Whole School Support Scheme’. He contributed through professional occupational therapy knowledge and by leading colleagues to exercise the curriculum in the classroom.

6.1.2.3 Culmination of school: Become an innovation facilitator

The Vice-Principal and the Subject Coordinator are now the innovation facilitators at school. This school was established in 1979 on a very small campus set over two floors. The small, close-knit teaching community consists of only 35 teachers. The Principal has served in this school for 20 years. Although the school operation is smooth and stable, the decline in the birth rate and the number of special needs students meant that the school was used to facing intake problems. Since two entrepreneurial teachers - the Vice-Principal and Subject Coordinator, joined this school, they have won two Chief Executive Awards for teaching excellence and five Quality Education Fund awards. The school has reached the pinnacle of innovative teaching, there are no longer student intake problems. Because of their successful experience, the Vice-Principal and Subject Coordinator now have one more role at the school – to create a facilitating innovation system at school. Their responsibility is to help teachers by generating new ideas and actualizing them.

6.1.2.4 Difficulties in actualizing curriculum

Compare with the other cases, case three, which is a special needs school, faced some survival issue. I identified five difficulties they faced in actualizing the new curriculum. First, the number of students was dropping since the decline of birth rate in 1993 and the promotion of inclusive education. It directly affected the funding that they received from the government. The school has limited financial sources to support any new project. Second, Teacher overload is any other critical issue for developing new curriculum. Every special need school's teacher has a few vacant lessons only. They need to stay in the classroom with students for the whole day until students left. It is difficult to invite the teacher to start any new project at school. Third, teachers used to employ the traditional teaching approach with positive feedback at school. They have a strong perception that traditional method always works, especially they are running out of time to develop anything new. Last, there was no collaboration among colleagues. Because of the

specialization of subject knowledge, colleagues seldom intervene in others teaching approach. However, teachers emphasized that they had a close relationship because the school size and number of staffs are small. They cared for others as a friend. Their communication practice showed that there was a good informal communication among teachers, while teachers were not working with others collaboratively. I categorized the above difficulties into three major aspects. They were: lack of resources (decline in birth rate), technical issues (teacher overload and resistant to change), and human relationship (no collaboration). For solving the problem of lack of resources, I explain it in section 6.2.4, strategies resources. For the technical issues, I explain how entrepreneurial teachers overcome these difficulties in section 6.2.5 and 6.2.6, coordination competency and humility-confidence. For human resources, I mainly explain it in section 6.4.1 and 6.4.3, the communication network and principal leadership.

6.1.3 Context of case

Table 6.2 illustrates the summary of section 6.1. In considering the role of the Vice-Principal and Subject Coordinator, the context of the case is set by their entrepreneurial behavior in the development process of the school-based curriculum and their leadership in the facilitating innovation system at school. I interviewed the Principal, teachers and social worker, who worked closely with them in these two significant areas. I also studied their curriculum, resources, lesson observation, and students' work to reflect the full picture of TEB in developing the curriculum and leading the facilitating innovation system. Section 6.2 presents their entrepreneurial behavior in these two duties. Then, I analyzed the impact of entrepreneurial behavior in the development of the school-based curriculum and their leadership of the innovation facilitating system. The last part presents how the school's conditions enhanced their entrepreneurial behavior in these two duties.

Table 6.2 Background information of case three

	Detail
Entrepreneurial teachers	Vice-Principal and Subject Coordinator
School	Special needs school
Year of award	2015
Reason of being award	School-based curriculum (Whole School Supporting Scheme)
Scores from Judges	50/60
Boundary of case - Event	The process of developing the school-based curriculum and leading the facilitating innovation system
Boundary of case - Interviewee	Senior – Principal Colleagues – 3 Core team members – 1 social worker
Boundary of case - Other sources	<ul style="list-style-type: none"> - Teaching and learning materials - Subject plan and report - Students' work - Lesson observation

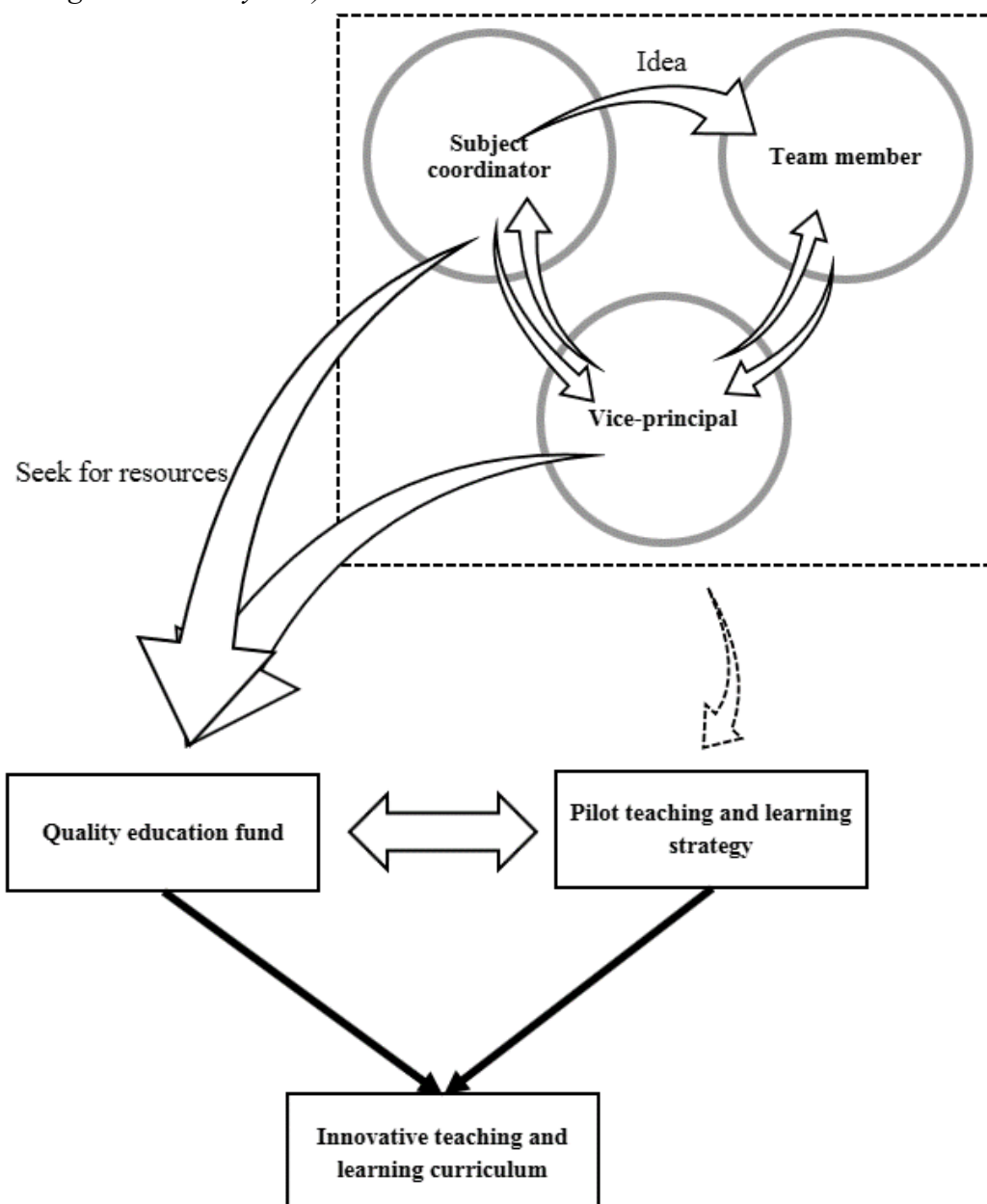
6.2 Performing TEB as an innovation facilitator

The Vice-Principal and Subject Coordinator performed TEB in developing the school-based curriculum (Whole School Supporting Scheme). Their successful process of developing the awarded curriculum became the general practice, called facilitating innovation system. They are in charge of the system. Therefore, they claim to be innovation facilitators at school. Figure 6.2 indicates the process of generating a new school-based curriculum in the facilitating innovation system. In general, the innovative teaching and learning strategies were created by the Subject Coordinator and his core team member. They developed the pilot strategy with the Vice-Principal. In the trial and error phase, the Vice-Principal and Subject Coordinator reflected on the effectiveness of the strategy and sought potential funding to support their idea. With the support of the Principal and the rigorous school system, they finalized the school-based curriculum with colleagues. With the guidance of their entrepreneurial behavior, they have qualified for five Quality Education Fund awards in the past ten years.

In this section, I analyze the Vice-Principal and Subject Coordinators' entrepreneurial behavior by reviewing the process of developing the awarded school-based curriculum and

their role in the facilitating innovation system.

Figure 6.2 The process of generating innovative ideas with the entrepreneurial teachers (facilitating innovation system)



6.2.1 Risk-taking

The Vice-Principal and Subject Coordinator treat the problem of teaching and learning as an opportunity for improvement. The reason for promoting the awarded school-based curriculum was their initiative of changing teaching and learning. The Principal and teacher B describe that they found the Vice-Principal and Subject Coordinator to be courageous in trying new teaching and learning strategies.

‘We are experts in a certain area. We know that there are some problems in teaching. So, we integrated our professions into teaching. ... We have nothing to lose. Just try it.’ (Subject Coordinator)

‘He (Subject Coordinator) has the idea. So, we work together and try it out... For me, we should do it and then review it. I think this is the review process to see the effectiveness of our teaching.’ (Vice-Principal)

The Subject Coordinator is a confident occupational therapist. He identified the traditional teaching and learning problems from his professional insight. Then, he discussed the problem with the Vice-Principal and core members. They also regarded traditional teaching and learning problems as an opportunity to change the traditional pedagogy. Although they foresaw the possible risks in mobilizing colleagues to participate in the new curriculum, they took these risks as part of a review process. They thought that there was no drawback in promoting a new curriculum. They could fix all the problems using their professional knowledge. Even if the curriculum was out of control, they assumed and accepted that the only potential loss was the failure of the new curriculum. Because they were willing to bear the risk, they promoted the new school-based curriculum at school.

6.2.2 Autonomy-enthusiasm

Once the Vice-Principal and Subject Coordinator visualized the concept of changing the teaching and learning strategy, they took the initiative in getting the task done.

‘It (the curriculum) is all about students. The purpose is for the students, by the students. They (Entrepreneurial teachers) just want to do it for students.’ (Teacher A)

‘They are devoted to it. Honestly, I did not push them, they did it automatically.’ (Principal)

‘I love thinking. The process of solving the problem is a wonderful journey. When you commit to it that is a happy moment for me.’ (Vice-Principal)

The Vice-Principal and Subject Coordinator believe that the reform of the school-based

curriculum is the only way to facilitate students learning. Moreover, they like problem-solving, especially with regard to the teaching and learning pedagogy. They think that developing a new school-based curriculum is a problem-solving process for them. Therefore, they advocate changes to the original curriculum.

In order to develop the initial plan for the school-based curriculum, the Subject Coordinator studied other schools experience and international journals. His enthusiasm motivated his studies and generated new ideas. When he came across difficulties of validating the strategy, he sought the education psychologist's advice. The Vice-Principal would discuss the possibilities and implementation plan with him. They brainstormed the ideas together. In generating the initial idea of a school-based curriculum, the Vice-Principal and Subject Coordinator were enthusiastic in studying materials and automatically sought internal experts' advice. The process of generating the idea was a problem-solving process, and that was the reason why the Principal and teachers emphasized their autonomy-enthusiasm in the interviews.

6.2.3 Innovation

In the interview, I found that, for the Vice-Principal and Subject Coordinator, innovation was not the original idea. They developed the innovative school-based curriculum by employing the two significant competencies of knowledge transfer and continuous modification.

6.2.3.1 New item - Knowledge transfer

The process of generating new ideas for the school-based curriculum in case three is slightly different from the case two's contextualizing creativity. The Subject Coordinator and Vice-Principal were an occupational therapist and an information technology engineer. Their professional background provided a different angle to teaching and learning for teachers.

'He is an occupational therapist. He has new ideas to help students develop their living skills. He combined the ideas of occupational therapy with

teaching.’ (Teacher B)

‘They decide the social interaction story. There was a story for students.

They followed the instructions and learned from the video.’ (Teacher C)

They realized there was a problem with the traditional teaching pedagogy in school in that there was a disconnection between the school curriculum and real living practice. They used their professional knowledge to develop a new approach to deliver the same topic. The Vice-Principal investigated the possibility of integrating information technology into teaching, while the Subject Coordinator combined occupational therapist practices with teaching. As teachers point out, their new ideas are innovative and different from other teachers.

For instance, the Subject Coordinator understood the importance of demonstration in teaching. He believed that students needed to review the illustration individually and repetitively. Therefore, he designed ‘video demonstration materials’ with the Vice-Principal. The Subject Coordinator contributed to ‘how to teach’ while the Vice-Principal contributed to ‘how to work’ by designing a user-friendly interface for students to review the videos.

The Vice-Principal and Subject Coordinator worked hand-in-hand. They developed the pilot teaching and learning strategies for teachers, such as musical learning and social interaction stories. These were the result of knowledge transfer from occupational therapy and information technology to teaching pedagogy.

6.2.3.2 Continuous modification

The pilot teaching and learning strategies were the prototypes for the new curriculum. The Vice-Principal and Subject Coordinator discussed and shared their ideas with the core team members.

‘We would try to work it (pilot teaching strategy) out. The atmosphere is good. We are happy that they take our advice. There are no secrets between

us. We only want to make things right.’ (Social worker)

‘We care about students’ learning. We all understand that there is no fixed solution. So, by listening to others, we may find the way out.’ (Teacher C)

The discussion mainly focused on facilitating students learning. They were open-minded in accepting core team members’ critiques on the pilot teaching and learning strategies. Core members also tried to adopt the new teaching strategies in their classes. They provided feedback and advice to the Vice-Principal and Subject Coordinator. Every member was selfless in that they wanted to modify the teaching strategy for the benefit of the students.

‘I think we have a moral purpose. Colleagues may have positive or negative feedback. This may be my mistake. We are a team. I need to listen and care about them. Try to amend it if I can.’ (Subject Coordinator)

The Vice-Principal and Subject Coordinator cherish teachers’ comments. They understood that teachers are lack of collaboration before. They want to gain their trust to adopt their teaching materials. When there was any difficulty in implementing the new teaching strategy, they questioned themselves through self-reflection. They would figure out the problem in their design instead of blaming the problem on teachers’ capability. As the Subject Coordinator explained, they consider teachers’ feelings in implementing new teaching strategies, because they are the users. They take teachers’ comments as an opportunity to improve the new teaching strategy. With this positive and reflective attitude, the Vice-Principal and Subject Coordinator were continuously modifying and developing the school-based curriculum.

To sum up, the innovative school-based curriculum is the result of professional knowledge transfer and continuous modification of the pilot teaching strategy. The Vice-Principal and Subject Coordinator are the idea generators and work with the core team members to modify it on a trial and error basis.

6.2.4 Strategic resources

The Vice-Principal and Subject Coordinator have a common practice that applies funding to support the new school-based curriculum or teaching strategy.

‘Because we have the pilot, we could apply for funding to do the whole-school implementation.’ (Subject Coordinator)

‘We have a good idea. Why don’t we try to find more resources to promote it at school? I think it is worth doing so. We always apply for funding for this reason. We usually succeed in the application.’ (Vice-Principal)

Although core members tried the school-based curriculum as a sample for colleagues, they understood that they needed more resources such as IT devices and training workshops if they were to enable teachers to adopt the school-based curriculum. As a small special needs school, they were running out of resources, especially money. Therefore, the Vice-Principal guided the Subject Coordinator through applying for the QEF to support the whole-school implementation. They used the money to recruit teaching assistants, bought equipment to develop the teaching materials and conducted training for teachers.

They did not only apply to the QEF solely for funding the successful new school-based curriculum or teaching strategy, but also for solving technical problems in the pilot teaching strategies. For instance, the music teacher designed a new teaching pedagogy in music lessons. However, he had a technical problem in recording the video. The Vice-Principal and Subject Coordinator assisted him to apply to the QEF for money to buy equipment and employ an assistant to handle the technical problems.

The Vice-Principal and Subject Coordinator have a blueprint for strategically seeking resources. They seek funding to nurture new ideas and support the school-based curriculum (Whole School Support Scheme).

6.2.5 Coordination competency

Through developing the new school-based curriculum and successfully applying for

funding the Vice-Principal and Subject Coordinator earned the opportunity to coordinate and mobilize teachers in the execution of the new curriculum as a whole-school approach. In this section, I have analyzed their coordination competency by considering the process of implementing the new curriculum and leading the facilitating innovation system.

6.2.5.1 New item - Innovation facilitator

The Vice-Principal and Subject Coordinator do not only generate innovative ideas, but they also play the essential role of innovation facilitators at school. Compared with the entrepreneurial teachers in cases one and two, they have a lot of innovative ideas for various subjects.

‘The Subject Coordinator is expert in handling teaching and learning to influence behavior. Teacher B is experienced and willing to share. Teacher C also has new techniques to share with colleagues. Teacher A is a new member of staff, but is enthusiastic and good at music.’ (Vice-Principal)

‘I had no idea what to do, I just like music. They found me and asked me to develop something new.’ (Teacher A)

They understand their colleagues’ characters and expertise in specific areas. When they decided to address specific teaching and learning difficulties at school, they would approach potential colleagues to join their team.

‘I am not the expert in their subject. So, I have the responsibility to communicate with them.’ (Subject Coordinator)

‘They shared information and comments. They may even seek my advice in generating ideas.’ (Social worker)

‘They always found me to comment on other subject ideas. That’s interesting. There are many new ideas.’ (Teacher C)

The Vice-Principal and Subject Coordinator thought that the teachers were the experts in certain aspects, such as music and physical education. Therefore, they preferred to be

facilitators instead of leaders in generating the ideas in these subjects. They listened to subject teachers' concerns and initial thoughts in developing the subject curriculum. They might go back to seek the core team members' comments on subject teachers' ideas. The idea generation process swings repeatedly between subject teachers and core team members because the Vice-Principal and Subject Coordinator wish to collect constructive advice from colleagues.

Once the Vice-Principal and Subject Coordinator understood the advice from teachers and core team members on the core values of designing the new subject-based curriculum, they would become the innovation facilitators.

‘They are the brain of our school. Teachers have ideas, while they have experience. They developed the ideas hand-in-hand.’ (Teacher C)

‘I have ideas, but I don't know how to achieve them. The group help me to make it happen. It is quite systematic.’ (Teacher B)

They clarified the purpose of designing the new school-based curriculum with subject teachers. As experienced school-based curriculum developers, they provided administrative support, such as writing a plan, applying for the resources, reviewing teaching strategies, and assessing the performance. They wanted to ensure that it was mainly the subject teachers who generated the ideas because they are the implementers of their subject-based curriculum. Their duty was to stimulate subject teacher thinking and provide administrative support only.

This supporting system has become a regular system at school. When a subject teacher has any new idea, they can approach the Principal immediately. Once the Principal approves, the Vice-Principal and Subject Coordinator form a discussion group with the subject teacher. They go through the process of discussion, consultation, development, and implementation. Therefore, teachers call them innovation facilitators at school.

6.2.5.2 *Directional persistence*

The entrepreneurial teachers' professional background was the driver of persistence and the primary reason behind the direction of the school-based curriculum.

'My profession is an occupational therapist. I insist on training their life skills.' (Subject Coordinator)

'I use IT competence to do the data mining. I know the weakness of our teaching, the way for us to modify teaching is with IT.' (Vice-Principal)

As a former occupational therapist and information technology engineer, they formed a specific view of nurturing students' development. For example, the Subject Coordinator believes that equipping students with life skills was the first priority, while the Vice-Principal explores the integration of teaching and information technology. They formed the direction of developing the school-based curriculum by data mining and field experience at school. They believe that this direction is beneficial to students' development and emphasize it accordingly in developing the curriculum.

In order to ensure the curriculum adheres to their direction, the Vice-Principal and Subject Coordinator work closely together and employ close monitoring.

'Some must say no to the curriculum. They encountered many difficulties and failure. ... No other way. I worked with them, taught them.' (Subject Coordinator)

'They insist on doing it. There must be failures, but they never give up.' (Teacher B)

They worked with the teachers to test the applicability of the school-based curriculum. In the implementation process, there were many difficulties and barriers. Teacher resistance and reject to collaborate with them are very common at the beginning. However, they treated it as a trial and error process. Their persistence was the key to actualizing the school-based curriculum direction.

6.2.5.3 Sensible and well-organized pilot sampling

In developing the school-based curriculum, the Vice-Principal and Subject Coordinator demonstrated sensible and well-organized leadership in mobilizing colleagues, especially in forming the pilot sampling.

‘He (Subject Coordinator) likes planning and organizing, so do I. We do a lot at school.’ (Vice-Principal)

‘They are the coordinators. They designed the working process for the teachers. They unified and motivated us.’ (Teacher C)

They are interested in planning and organizing a curriculum reform. They follow the school’s rigorous operation system and design the mechanism for promoting the new school-based curriculum. According to teachers’ feedback, they are sensible and well-organized in leading the teachers.

In general, the Vice-Principal and Subject Coordinator will form a pilot sample for teachers. They invite the core members to join the seed project.

‘For example, the social interaction story was developed by our team. We were not greedy. We tried to do one topic first.’ (Subject Coordinator)

‘For the first year, we tried the school-based curriculum with our core members only. If it works, we promote it to other teachers.’ (Social worker)

They want to establish a successful example in a small group first, it is easier for them to monitor and control the quality of a small group. Therefore, they will try to work with a small group on one or two topics for new teaching strategies. For the school-based curriculum, they invited the small group to do the pilot curriculum for one year.

‘They respect our innovations. I write a lot of songs for the curriculum, they never interfere with my creation unless I cross the bottom-line of the school-based curriculum.’ (Teacher A)



‘They review the plan and report. In fact, if there was some pressure, they might check the process.’ (Teacher C)

In the pilot sampling, they had a clear focus in mind. They reviewed the plan and monitored the implementation process closely. Teachers responded that they had a high degree of freedom in the implementation, while the Vice-Principal and Subject Coordinator talked with them regularly. When there was any possibility of violating the principal direction of curriculum, they might intervene. For instance, they commented on the selection of music in the video for ensuring the interest of students. When they have a successful pilot sample, they apply for the Quality Education Fund.

During the implementation process of the pilot sampling and initiating the whole-school implementation, teachers found that the Vice-Principal and Subject Coordinator were sensible and well-organized. They considered the planning carefully and established a pilot sample first. Based on the successful experience, they sought more resources and convinced colleagues to adopt the new curriculum as the whole school approach. This practice has been employed for every new project. They established a regular operation flow for the school.

6.2.5.4 Leading as a role model

All interviewees stated that the Vice-Principal and Subject Coordinator were role models in implementing the school-based curriculum. As the Principal explained, he expects middle leaders should lead their colleagues by example. The Vice-Principal and Subject Coordinator take the initiative to develop new ideas and execute them.

‘Colleagues might worry about the possibility of success. We found they feel the same thing. They act it out and solve it.’ (Teacher B)

‘They give me direction. They set up everything with me. We work and share together.’ (Teacher A)

When they faced difficulties in the school-based curriculum, they tried to solve the

problems on their own. It impressed colleagues that they demonstrated how to deal with difficulties. Furthermore, teachers are encouraged to seek their advice in the implementation process. They also have the opportunity to work with the Vice-Principal and Subject Coordinator in the lessons or preparing materials. The Vice-Principal and Subject Coordinator fulfill the main expectation of leading their team as role models.

6.2.6 New items - Humility-Confidence

Genuine care is the primary factor for entrepreneurial teachers to work with colleagues. They emphasized the importance of caring for teachers and the influence on their coordinating style.

6.2.6.1 Genuine care and confidence

The Principal's leadership has a strong influence on the Vice-Principal and Subject Coordinator. The Principal emphasizes genuine care in leading teachers. In fulfilling this purpose, he teaches the entrepreneurial teachers to be courteous but confident middle leaders.

‘They would not force colleagues to do the task. Generally, they invited colleagues to listen to them and shared their experience. They showed empathy in implementation.’ (Teacher B)

According to teachers' feedback, the Vice-Principal and Subject Coordinator are confident in their ability. When they work with colleagues, they have confidence in sharing their viewpoint and providing solutions. Teachers felt that they care about teachers' feelings in performing their tasks.

6.3.6.2 Genuine care and humility

Teachers also recognised the Vice-Principal's and Subject Coordinator's genuine care and humility in leading them. The Vice-Principal and Subject Coordinator foresaw the drawback of forcing teachers to complete the task. They preferred to employ the 'soft approach' to mobilizing teachers. They listened to teachers' difficulties and cared about

their concerns first.

‘We cannot push them. They may be right. I need to know the whole picture and find out the solution.’ (Subject Coordinator)

‘Sometimes, he may do it for teachers. He cared how they felt about the new curriculum.’ (Teacher B)

To figure out the solution, they put themselves in the teachers’ shoes. They explored how to motivate teachers to adopt their strategies. In some challenging situations, they might handle the challenging task on their own and pass the rest of the task to teachers.

Even though the Subject Coordinator and the Vice-Principal had developed a successful school-based curriculum; they considered teachers’ feelings in employing it. They minimized teachers’ resistance by preparing a lot of new teaching and learning materials for teachers to use. Their genuine care and significant contribution won teachers’ appreciation. However, they presented their ideas humbly and supported their colleagues. As teachers explained, they appreciated the humility of the Vice-Principal and Subject Coordinator in leading their colleagues.

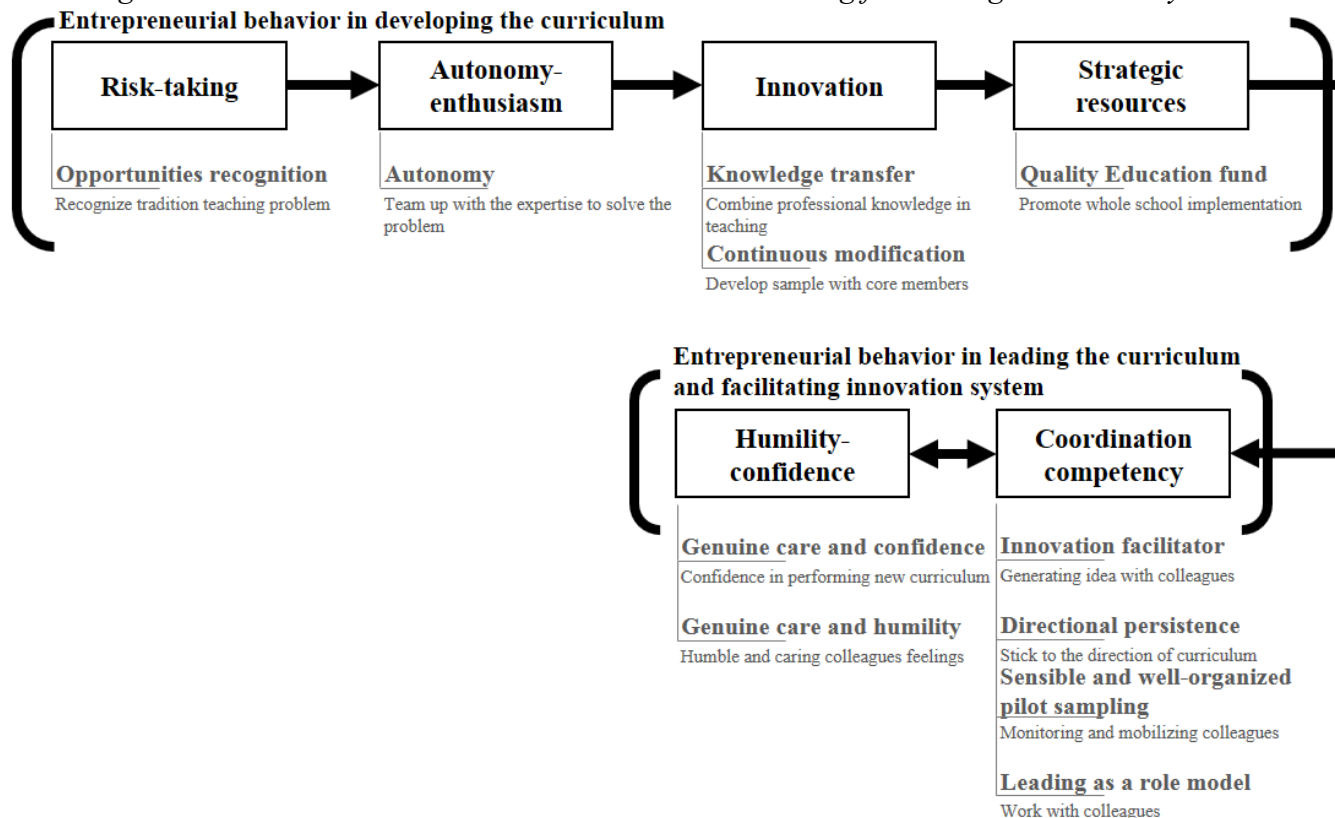
6.2.7 Summary for performing entrepreneurial behavior as a team

The characteristic of genuine care in the Vice-Principal and Subject Coordinator influences their TEB at school. They are humble in leading their members. Figure 6.3 shows the entrepreneurial behavior of the Vice-Principal and Subject Coordinator. Their professional background enhances their confidence in identifying problems and deciding the direction for generating new ideas. They are not arrogant leaders, they understand the importance of humility in leadership. They revise ideas with core members in the pilot sampling.

Furthermore, they aim at securing the quality of the new curriculum by applying for external funding. They also use the rigorous operation system to monitor and care for colleagues in the implementation process. These entrepreneurial behaviors promote the innovative school-based curriculum. The successful experience finally becomes a

systematic operation system, or ‘facilitating innovation system’, for generating innovative ideas for teaching and learning. They have also become innovation facilitators in school.

Figure 6.3 TEB in the school-based curriculum and leading facilitating innovation system



6.3 Impact of TEB

The Vice-Principal and Subject Coordinator developed the school-based curriculum for teachers and students. When they mobilized teachers to adopt the new curriculum and teaching strategies, teachers had significant changes in teaching and learning performance. Teachers also perceived a positive impact on student learning. Therefore, in this section, I analyze the impact of TEB from the perspectives of the teachers (Direct), students (Indirect), and school (Indirect).

6.3.1 Enhancing teacher's performance

Teachers were the participators in, and developers of, the new school-based curriculum. From the teachers' feedback, I have identified three major impacts of TEB on teachers. They are: reflecting teaching performance with IT support; stepping out of their comfort

zones; and taking the initiative.

6.3.1.1 Reflecting on teaching performance with IT support

The Vice-Principal and Subject Coordinator utilize information technology to enhance teachers' performance in teaching and learning, which in turn triggers teachers' self-reflection.

‘We are not a normal school. Our authentic assessment is to record students’ behavior. We need to develop some materials for the teacher to use anytime. We aim to facilitate their teaching.’ (Principal)

According to the Principal's explanation, the pedagogy of teaching special needs students is authentic learning and assessment. Teachers need to provide a real example for students. However, the standardization of pedagogy or examples was a challenging task for teachers. To address the standardization issue, the entrepreneurial teachers adopted information technology to provide an example for the teacher. They created a teaching package for teachers that included lesson plans, unit plan, instructions for teaching, and teaching materials. Teachers could assess this information and study it on their own.

They maximized the synergy between the information technology system and the Nam Chong information meeting, which helped teachers to master the new curriculum. In addition to regular meetings and the sharing of materials on the IT system, the Vice-Principal and Subject Coordinator monitored the implementation process in the Nam Chong information meeting and through informal communications.

‘We would share our difficulties. It would not be very smooth at the beginning, but they might have the solution after the meeting.’ (Teacher B)

‘Don't expect that we have the solution. For me, we have a chance to talk at least.’ (Teacher C)

‘We communicate in the Nam Chong information meeting. We share we communicate. They would find me after that.’ (Teacher D)



In the meeting, teachers shared their experiences of using the new curriculum materials without solutions. Although the meeting was not for problem-solving, the entrepreneurial teachers recognized the need for implementation and tried to figure out the possible solutions with the core team. They would then advise teachers to employ their new solution through the informal communication channels.

‘They (Vice-Principal and Subject Coordinator) gave me many constructive pieces of advice. This is a mentoring system. I can reflect on what we did.’

(Teacher B)

‘You will now see the whole picture. We are like a part of a machine, but we can see the whole picture. We dig into the weaknesses and fix them.’

(Teacher D)

Following the Vice-Principal and Subject Coordinator intervention adopting the new curriculum, teachers had a chance to reflect on their own teaching. They found that they had the chance to understand the full picture of the new curriculum through reviewing the documents, discussing the issue through an information technology system and the Nam Chong information meeting. When the entrepreneurial teachers talked with them in person, they acquired and mastered a new teaching strategy. As the teachers explained, the interaction with the entrepreneurial teachers was a reflective process for them. They reviewed the missing links and revised the strategies and materials with the entrepreneurial teachers. The reflective process even mobilized teachers, who had been resistant to changes, to try the new teaching strategies for the curriculum.

‘For many experienced teachers, they were so lazy. However, they found that these people (Vice-Principal and Subject Coordinator) had a new idea and it worked. ... They finally tried to do it with them.’ (Teacher C)

The above strategies indicated that the Vice-Principal and Subject Coordinator tried to use the information technology, the Nam Chong information meeting, and informal communication channels to facilitate teachers’ reflection and modify the new curriculum.

6.3.1.2 Stepping out of comfort zone

The Vice-Principal and Subject Coordinator motivate teachers to acquire new teaching pedagogy at school, which promotes teachers' high job satisfaction and encourages them to step out of their comfort zone in teaching.

'I never thought about that. I use these techniques in my teaching. Students are so happy. I was invited to share with others.... I sense the responsibility of continuous improvement now.' (Teacher B)

'Unity. Education is about unity. We now try to use these new things together. All teachers have the breakthrough. That is happy.' (Teacher C)

'I was influenced by them. They inspired me to be an active social worker in teaching and learning. Compared with other school social workers, I take an active role in teaching.' (Social worker)

Teachers perceived that continuously modifying pedagogy enhanced students learning performance. They stated that this successful experience of adopting the new curriculum mobilized teachers to commit to improving their teaching. For example, teacher B adopted iPads in teaching music. He had an opportunity to share this successful experience with colleagues and other schools teachers. This experience encouraged him to adapt and modify his teaching. According to social worker and Principal explanation, many teachers now step out of their comfort zone, even the social worker. They abandon the traditional teaching pedagogy and try to modify the new curriculum to fit their individual needs in teaching.

6.3.1.3 Taking the initiative

Teachers stated that they take the initiative in developing a new curriculum and apply for QEF because they were inspired by the entrepreneurial teachers' successful experience and support. As the TEB section mentioned, teachers acquired new teaching pedagogy from the Vice-Principal and Subject Coordinator, while the Principal also provided administrative support for teacher professional development. Teachers were well-equipped for developing innovative teaching and learning strategies at school.

‘They (Vice-Principal and Subject Coordinator) showed the path of success to our colleagues. Teachers believed that it is possible for them to do the same things.’ (Teacher B)

‘Many subjects try to develop new materials now. They approach the Vice-Principal and Subject Coordinator.’ (Social worker)

‘Very busy. Project by project. It is non-stop. They receive the Principal’s approval and pass it to me.’ (Vice-Principal)

Teachers realized that the Vice-Principal and Subject Coordinators’ successful experience was achievable. They might have the capability to develop a new school-based or subject-based curriculum as well. Therefore, they tried to develop their own innovative ideas with the entrepreneurial teachers. According to the social worker’s observation, many subjects took the initiative to develop the subject-based curriculum. For instance, a language teacher developed a movie for the teaching content, which was about video modeling. As the Vice-Principal explained, he did not initiate any new projects recently because he was busy assisting other subjects in the facilitating innovation system.

‘They were good at planning which is what teachers were not so good at. Therefore, they would approach the Vice-Principal and Subject Coordinator. Some teachers succeeded in applying for QEF with their support. Now, more teachers try to approach them.’ (Social worker)

The facilitating innovation system plays a paramount role in encouraging teachers’ initiative. The Vice-Principal and Subject Coordinator are the innovation facilitators at school. Teachers with no relevant experience in planning and organizing a new curriculum, gain valuable advice from the entrepreneurial teachers. Many teachers seek their support because they claimed that they believe in the entrepreneurial teachers’ insight into developing the curriculum and their administrative judgment. Therefore, the facilitating innovation system has been formed into a school system. Many teachers actualize their innovative ideas at school now.

To conclude, interviewees think that the Vice-Principal and Subject Coordinator have a significant influence on teachers' performance. They are the facilitators who mobilize teachers to adopt new teaching pedagogy and curricula with information technology support. They might trigger teachers' self-reflection and motivate them to step out of their traditional teaching comfort zone. Their successful experience has become a model for teachers to take the initiative in developing a subject-based curriculum and materials. As a result, more innovative teaching strategies are generated at school.

6.3.2 Nurturing students' growth

Compared with the regular schools, the special needs students' academic performance is not the major focus of teaching. The intention of entrepreneurial teachers in performing the entrepreneurial behavior is to form a curriculum that could enhance students' self-management skills and engagement in learning. Entrepreneurial teachers want to help their students to survive in a society with a positive attitude. Therefore, entrepreneurial teachers try to form positive teaching and learning conditions for students with teachers. According to the entrepreneurial teachers' intention of developing the curriculum, I analyze teachers' perceptions on students' growth in this section.

6.3.2.1 Nurturing self-management

According to the teachers' observation, students showed improvement in self-management skills after they studied the new school-based curriculum, these skills are challenging for special needs students. They cannot control their muscles smoothly. Traditionally, the teacher would demonstrate the movement to students many times and guide students in performing it. However, the teacher might not be able to perform multiple tasks and cater for learning diversity.

'We aim to help students be independent. ... There was no quantitative evidence to support the effectiveness of my curriculum, but we saw the improvement. We did not need to help them to tie their shoes anymore.'
(Subject coordinator)

'This curriculum is for all students. Don't expect that we have various

focuses for specific students. However, it is valuable for students, they are self-controlled now.’ (Social worker)

‘Parents told me that their children were able to handle the basic things now.

They were so happy. It released them to take care of other things.’ (Principal)

The entrepreneurial teachers foresaw the problems of traditional teaching methods, as section 6.2.1 risk-taking stated. They developed the new school-based curriculum, which integrated with information technology into social interaction lessons. Picture 6.1 is an example of social interaction materials. The Subject Coordinator believed in his profession of an occupational therapist. He insisted that teachers should focus on students performing practical tasks instead of watching the teachers performing demonstrations. Therefore, teachers were required to broadcast the video in their lesson. Every student had an iPad. Teachers catered to the individual student’s needs and adjusted the learning process for each student.

As teachers said, students can perform self-management tasks now, such as fastening clothes, washing dishes, and tying their shoes. Teachers and parents no longer take care of these minor tasks for the students. Although the design of the new curriculum is not tailor-made for individual students, the curriculum enhances basic living skills. Compared with past performance, students show significant improvement.

Picture 6.1 Example of the social interaction materials





6.3.2.2 Engaging in learning

Teachers perceived that the entrepreneurial teachers' school-based curriculum enhances students' engagement in learning. The attention span of special needs students is comparatively short. In the past, two teaching assistants were staying in the classroom to monitor students' behavior. Conversely, the new school-based curriculum promotes fun learning for students, which engages them in learning.

'They promoted the joy of learning in our school. Every student has a role in the learning. No one is left behind.' (Principal)

'They were quick to get cross, however, the songs are like magic. They would follow the lyrics to say hi and bye. I also sing these songs in my lessons.' (Social worker)

The Vice-Principal and Subject Coordinator emphasize the joy of learning at school. The Principal agreed with this curriculum direction. They invited the music therapist to design a theme song for every topic. They sang a song on the school bus, at morning assembly, and in the classroom. The theme song led the students to perform standard behavior, such as lining up, waiting for washing, and being attentive in the lesson. As social workers stated, students used to express their temper improperly now they are attentive and well behaved in the lessons.

Students are not only engaged in learning at school, but they also enjoy learning at home. The relationships between parents and teachers are close in special schools. Parents care

about their children's learning process and report to teachers regularly.

'Parents always report their learning process to us. They saw changes. It is not academic. It is about attitude. They say 'good'.' (Teacher C)

'Parents said students love it. They view it again and again. They try to do the same things as the video demonstrates.' (Teacher A)

Parents feedback that they find that their children are gradually becoming interested in reviewing school teaching. They share what they have learned at school. Students use the iPad to watch the teaching videos and sing the songs many times. The hit rate of their YouTube channel was over 10,000 in one month. The new curriculum has become part of their lives.

To sum up, the challenge of enhancing special needs students' performance is forming good habits and promoting the joy of learning. The Vice-Principal and Subject Coordinator are devoted to addressing students' interests and needs. They invited a talented musical therapist to draw students' attention to learning and employed accessible information technology to facilitate teaching at the school. Through their entrepreneurial behavior, they constructed a school-based curriculum as a whole-school approach. According to teachers' observation, this condition, the curriculum, may be the primary factor that helps students to manage their living and enjoy learning.

6.3.3 School branding

The school-based curriculum has boosted the intake of students to the school, which is an indirect impact of the TEB. With the declining birth rate over the past 15 years, the student intake had not been stable before.

'More parents knew us... Our brand has become famous. I would say there is a commercial impact. This means we have goodwill now.' (Teacher C)

Because of the school-based curriculum, the Subject Coordinator won the Chief Executive

Award. Teachers were invited to share their successful experience with teachers and parents on various occasions. All interviewee said that parents, who have special needs children, knew more about the school operation. The award enhanced the school's reputation.

‘The status of the school has been improved. Media interviewed us many times. ... Parents were interested in our school. I don't worry about intake now.’ (Principal)

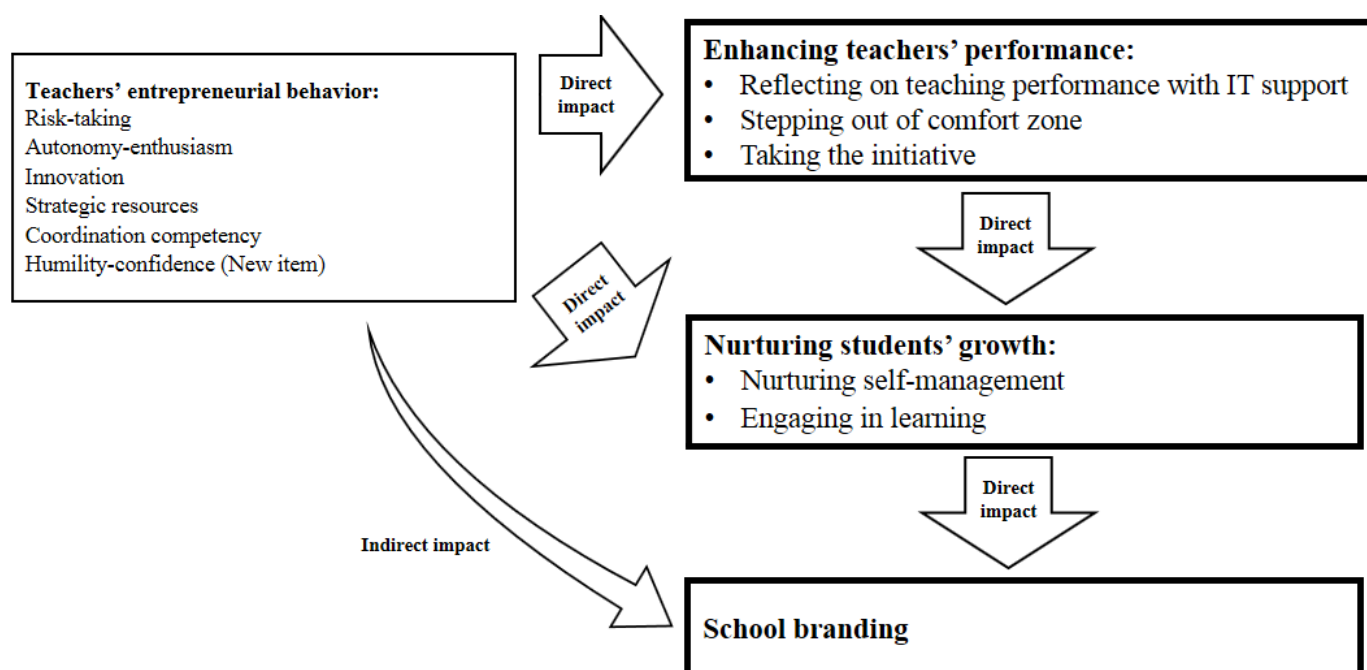
Mass media also promoted teachers' outstanding performance. Teacher believed that the Chief Executive Award was the benchmark for quality teaching, which attracted parents to apply for this school. The Principal emphasized that the branding increases the student intake. They do not worry about the declining student intake now.

6.3.4 Summary of the impact of TEB

Figure 6.4 indicates the impact of TEB. In promoting the school-based curriculum, the Vice-Principal and Subject Coordinator have unintentionally enhanced teachers' performance and formed an innovation facilitator system. Under their leadership, they have engaged students to learn and acquire self-management skills. The government recognized their outstanding performance in curriculum planning and nurturing students' growth by awarding the Chief Executive Award. The honor was not only recognition, but it also boosted the school branding.



Figure 6.4 Impact of TEB



6.4 The conditions for enhancing TEB

The Principal is a key factor in enhancing TEB. He has a close relationship with teachers and forms a positive school culture for the entrepreneurial teachers. His rigorous system also became a tool for the entrepreneurial teachers to execute their curriculum. In this section, I explain how the Principal's leadership contributed to the TEB and also his influence on the school culture, communication network and rewarding.

6.4.1 Principal leadership

The Principal's leadership promotes the Vice-Principal and Subject Coordinator's TEB in developing the curriculum and leading the facilitating innovation system. The Principal has served in this school for 20 years. He went through various challenges with colleagues, such as the cutting of the funding from the EDB, lower student intake, and curriculum reform.

‘We experienced the wave of changes many times. He experienced everything. That is why he trusts colleagues, and we trust him. He always made wise decisions and supported us.’ (Vice-Principal)

Teachers believe in his leadership and cherish his generous leading style. They think that he has the right direction for the school and cares about teacher development. Therefore, the Principal has a good relationship with the teachers. As a crucial person at school, I analyze how the Principal forms a condition to enhance TEB.

6.4.1.1 New item - Genuine care

In this case, the Principal has a significant image amongst colleagues, he genuinely cares. The entrepreneurial teachers' humility-confidence is an imitation of the Principal. The Principal demonstrates genuine care, which means caring for colleagues and others straight from his heart. He cares about teachers' feelings in teaching and performing school duties. Therefore, he emphasizes caring for others instead of pushing colleagues to do something. From this point of view, genuine care is a sign of respect for colleagues' contributions.

‘For me, the Principal trusts me. That is what I think. He never says no to my suggestions. He allows me to try. He has great patience.’ (Teacher A)

The new teacher explains that he feels the Principal's patience. The Principal understands the importance of allowing a new teacher time to adapt and adopt the new teaching strategies by trial and error. Teachers sense his genuine care from his tolerance for adaptation time.

His genuine care is not only for the new teachers. In leading the senior staff, he also cares about their professional judgment and performance.

‘As far as I can see, the Principal understands his staff. He tries to keep a low profile and emphasize teamwork. He is caring to them rather than instructing them.’ (Social worker)

‘He wants to ensure that everyone feels comfortable in the changing process. He never feels discouraging.’ (Vice-Principal)

The Principal recognizes the importance of teachers' professionalism and that every teacher has expertise in specific aspects. Instead of intervening in their decision making and operation, he decides to show his caring to the senior staff by cultivating a positive team working environment. His belief is the same as the previous cases' Principal. The interviewees stated that the Principal listens to teachers' concerns and offers feedback to them with clear directions. If, somehow, he made a wrong decision, he would accept the mistake and correct it. The Vice-Principal and Subject Coordinator appreciate his genuine care for colleagues, which provided a platform for them to develop the school-based curriculum. In the interview, the Vice-Principal and Subject Coordinator stated that the Principal's genuine care influences them. They have confidence in developing an innovative teaching and learning pedagogy because the Principal trusts them. Moreover, they found the importance and benefit of a genuinely caring approach are gaining trust from other teachers. They decided to adopt the same genuinely caring approach in leading their team as the Principal did. Obviously, entrepreneurial teachers are affected by the Principal's leadership.

6.4.1.2 Directionality

The Principal has a clear direction for developing his school, which inspires entrepreneurial teachers to take the initiative in developing the new curriculum. The Principal seldom promotes curriculum reform or school practice to teachers.

‘We define the direction step-by-step. Based on the school report, we review and take a look at others schools. It is just like a staircase.’ (Teacher C)

He understands that there is a lack of human resources in a small school. Therefore, he reviews the school operation and other schools' practices. Based on the information, he analyzes the future direction of curriculum reform. This reviewing process is systematic and transparent to colleagues. Usually, he defines only one direction and strategy for the school.

Nine years ago, the Principal foresaw the trend of curriculum reform in the special school.

He took the initiative to motivate the Vice-Principal and Subject Coordinator to conduct a reform at school.

‘I found the traditional teaching was not applicable to our students. I wanted to change. At the same time, the Principal approached me to do so. He told me the future picture of reform.’ (Subject Coordinator)

‘He knew the future direction. He was going to echo what the Chief Executive mentioned in the education policy. That is why he asked us to apply for funding.’ (Vice-Principal)

As the Vice-Principal and Subject Coordinator stated, the Principal realized that it was the right time to introduce reform in their school. He encouraged them to plan a new curriculum and apply for external resources for students. He did not get involved in the detailed planning, but he provided a clear focus for the reform.

When teachers were designing and piloting the school-based curriculum, the Principal did not intervene in their implementation process. As the directional leader, he respected the autonomy of the subject panel. The Vice-Principal observed that he would only check the direction of the plan. Teacher A, who is the core member in reform, echoes that the Principal guided them with direction and respected their autonomy in developing their subject-based curriculum. Apparently, he is a directional leader who respects the teachers’ professionalism.

Entrepreneurial teachers took advantage of the Principal’s approach as they promoted the new curriculum at school. The Principal agreed and supported their ideas, offering only a clear direction to follow. This practice left the Vice-Principal and Subject Coordinator with a high degree of autonomy when developing their curriculum.

6.4.1.3 Facilitative

The Principal facilitates the Vice-Principal and Subject Coordinator’s professional development in leadership and pedagogy. He cherishes the human resources in their school

and aims to facilitate their professional development. For example, he realized the need for specific expertise, such as teachers with specialist knowledge of autism. Therefore, he employed subject coordinators and encouraged the Vice-Principal to maintain their professional development. In general, his support for professional development is divided into administrative and personal.

‘He understands that our human resources are some of the most important resources we have. Therefore, he always thinks about how best to develop people.’ (Vice-Principal)

‘The Australia tour was very urgent. We had to apply for it within one month. I foresaw the opportunity for my career development.... The Principal just said yes. That is how caring he is.’ (Subject Coordinator)

‘He always assigns teachers to go out for learning. If you are interested, he will approve.’ (Teacher B)

With regard to administrative facilitation, he considers teacher professional development to be a responsibility of being a Principal. He hopes that teachers’ development will benefit their students. To fulfill the above purpose, he sends teachers to attend professional development programs every year. According to the Subject Coordinator’s testimony, the Australia tour took eight weeks in the school year. This could affect the routine operation of the school, and so the Principal decided to release him to join this meaningful program and recruited the substitute teachers he needed to cover for him. The Principal has several substitute experts for his school, the practice of sending teacher for professional development is common.

Furthermore, he lightens teachers’ workloads in order that they can perform new competencies in the new school-based curriculum. Refer to interviewee D’s explanation that teachers’ workloads may be reduced when they promote a new curriculum. Although the Principal has no specific skills to enhance teacher competence in designing the school-based curriculum, his administrative organisation helped the Subject Coordinator to gain insight and experience from outside.

To encourage personal growth, the Principal considers the leadership skills of the Subject Coordinator. Therefore, he stimulates the Vice-Principal and Subject Coordinator's thinking in developing the school-based curriculum. He pays attention to how entrepreneurial teachers lead his team. He shows his caring attitude by adopting a close monitoring strategy.

‘The Principal’s assistance is very helpful to me. His experience drives me to be a leader at school. I know how to manage my team and generate more ideas.’ (Vice-Principal)

The Subject Coordinator emphasized the impact of the Principal’s close monitoring many times. Experiencing the Principal’s leadership has influenced his own leadership style and inspired him to motivate colleagues in implementing the school-based curriculum. This is the growth of entrepreneurial coordination competency.

To sum up, the Principal adopted a genuinely caring leadership style at the school. He has a vision of leading his school by motivating and developing his colleagues in a respectful manner. His leadership has become the foundation of the school culture and structure. In the next section, I will analyze the organization culture.

6.4.2 School culture

The Principal’s leadership might also influence the formation of open and rigorous school culture. In this section, I explain how this culture enhances the entrepreneurial behavior of the Vice-Principal and Subject Coordinator.

6.4.2.1 Teachers’ openness with trust

The Vice-Principal and Subject Coordinator gain insightful suggestions from teachers because of the trusting and open culture at the school. As previously stated, the Principal adopts genuinely caring strategies in leading his school, as a result, teacher emphasized that many teachers are willing to serve and stay in this school. There is one evidence

provided by schools, according to the teacher profile statistics, over three-quarters of the teachers have served in this school for over ten years.

The genuinely caring atmosphere means that teachers form trusting relationships between themselves and with the Principal. They are willing to work hard and share their ideas with other teachers in order to develop the school-based curriculum. They work as a team.

‘For me, Nam Chong information meeting is a communication platform instead of managing platform. Teachers can share how to motivate students and improve teaching and learning... I feel everyone is open-minded.’
(Teacher C)

The Nam Chong information meeting is a typical example of openness among teachers. In this meeting, teachers share their views on designing and implementing the new curriculum. As the interviewee said, this meeting is an open platform in which to speak out and listen to others. Teachers cherish the open working atmosphere in this school. The Vice-Principal and Subject Coordinator are in the habit of consulting colleagues when they are generating new ideas. This open culture enriches the opportunities for creativity by entrepreneurial teachers.

6.4.2.2 Rigorous operation system

The school has a rigorous operation system in managing the school curriculum, which facilitates the Vice-Principal and Subject Coordinator to monitor and manage the new curriculum. Although the Principal adopts a genuinely caring approach to leading his colleagues, he has also established a rigorous operation system to manage the routine working process. According to the Vice-Principal, a regionally renowned scholarly expert in a local teacher education university appreciated the rigorous operation system in this school. Figure 6.5 indicates the rigorous operation system.

‘Not like the subject panel. We have a resource board, which is useful for monitoring. I would say... it is a good monitoring system. We know what

happens, how to gather information, what to do etc.’ (Subject Coordinator)

‘Every teacher stays at school for the meeting. This curriculum is a whole school approach. We need to know the process every day. This is necessary.’

(Teacher B)

The Principal does not rely on the traditional subject panel system. He formed a resources board with teachers and himself, in which teachers plan and execute the new operation strategies. In order to maximize the effectiveness of the resources board, there is a daily meeting after school, the Nam Chong information meeting. This is a close monitoring platform for teachers to voice their concerns and solve minor problems. Moreover, subject teachers also conduct regular subject meetings to evaluate the effectiveness of the new curriculum. In the end, there is an evaluation meeting for the board. They will modify the curriculum after one cycle. The Vice-Principal and Subject Coordinator employ this system as the basis for developing the new curriculum. Teachers use this system as a matter of habit. When the entrepreneurial teachers reviewed the effectiveness of colleagues’ implementation using this system, there was no resistance.

Furthermore, the rigorous operation system is supported by the Vice Principal’s updated information technology. Teachers and the Principal foresaw the needs of using information technology to monitor the routine operation and the new curriculum.

‘I need to ensure the continuous development of our school. IT is the way out. We need it to promote efficient management.’ (Principal)

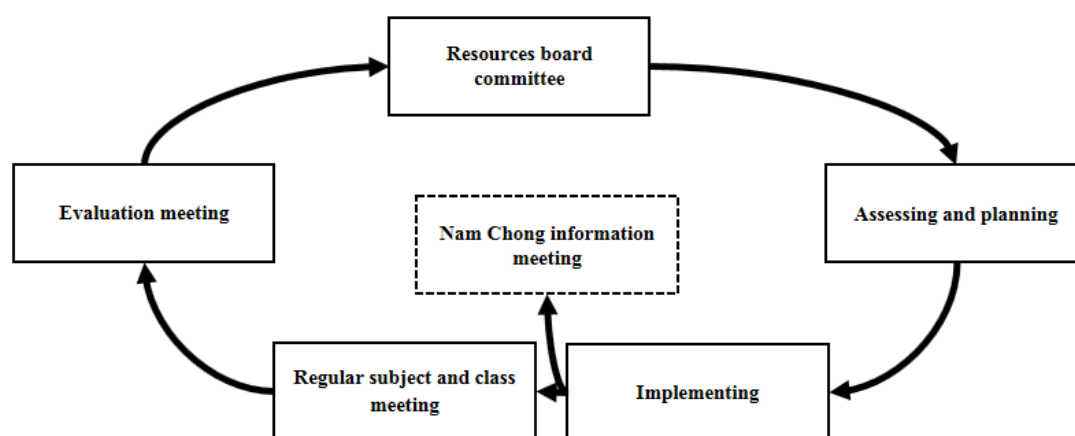
‘Some tasks were quite difficult to monitor. Quite lucky that we have the IT system to facilitate my monitoring duties’ (Subject Coordinator)

The Principal understands that he needs a storage and sharing platform for his colleagues. In order to fulfill this purpose, he continuously develops the school information technology. Teachers can access the updated information, while the middle managers can monitor their working process. The information technology also demonstrates genuine care for teachers. According to the social worker’s explanation, the school has a rigorous workload formula.

They use the IT system to calculate teacher workload in the year. This strategy aims at ensuring the fairness of teacher duties and avoiding overload. The information technology is a supportive tool to support the rigorous operation system because it considers teachers' workloads. It promotes the entrepreneurial teachers' curriculum by being an effective tool to disclose and monitor the working process.

The open and rigorous operation system has a positive impact on the Vice-Principal and Subject Coordinator. As both entrepreneurial teachers said, they find that the rigorous operation system promotes their efficiency in monitoring and mobilizing colleagues in the new curriculum. Teachers are willing to voice their concerns and are comfortable being monitored by the systematic operation system, because of this caring system.

Figure 6.5 The process of the rigorous operation system



6.4.3 Communication network

Compared with other cases, this school emphasizes the informal communication network. Formal and informal communication networks have been formed in this school and both facilitate the Vice-Principal and Subject Coordinator in mobilizing teachers in the new curriculum.

6.4.3.1 Formal communication network

As figure 6.5 illustrates, entrepreneurial teachers use the Nam Chong information meeting to monitor the implementation of the new curriculum. This is the additional formal communication network for teachers to identify the difficulties in the implementation of the new curriculum, especially the problem of lacking collaboration.

‘Just like the restaurant briefing. We aim to listen and check. We will know the immediate feedback from students.’ (Principal)

‘They (teachers) would share their concerns. Then, colleagues help each other. This is good communication.’ (Teacher C)

Teachers reported students’ feedback after school, which promoted teachers awareness of potential problems or good practice. The entrepreneurial teachers view the meeting as a regular review process for teachers to modify the implementation of the curriculum. For the teachers, this meeting enhances the communication among teachers as a professional dialogue. Teachers can share their experience in handling students’ learning difficulties. As the Subject Coordinator explained, this practice promotes a sharing culture and allows them to monitor colleagues’ performance.

6.4.3.2 New item - Informal communication network

The informal communication network maximizes the benefit of entrepreneurial teachers’ humility-confidence and coordination competencies. Teachers have an informal communication practice in discussing schools’ duties. Because of the small campus (two floors with only 10 classrooms), teachers meet each other in the playground or corridor. As teacher A said, teachers perform an informal professional dialogue every day. They discuss the strategy of teaching and learning, which offers an opportunity for entrepreneurial teachers promoting new curriculum.

‘We have a WhatsApp group. We discuss ideas there. The Principal also joins the group.’ (Subject Coordinator)

‘They are like the government. Gossip is quite common for them. They want to know colleagues’ responses. This approach is good for us.’ (Teacher B)

The entrepreneurial teachers formed a ‘Whatsapp’ group with the core team members and the Principal. They discuss new ideas and directions in the group. By considering teachers’ feedback, they may use the gossip approach to leaking some information to colleagues.

The core team tests the teachers' feedback whether positive or not. If they have a positive response, they may disclose the new direction and processed in planning. The Subject Coordinator found that the gossip approach is convenient and minimizes the adverse effect on teachers.

The Vice-Principal and Subject Coordinator also use the informal communication practice as a strategy. They discuss and monitor the implementation of a new curriculum with teachers on many informal occasions, such as patrol duty or lunch.

'Sometimes we may have a problem. I will approach him (Subject Coordinator) immediately. He has always got the solution.' (Teacher C)

Teachers found that this informal communication approach is a convenient way for them to connect with the Vice-Principal and Subject Coordinator. When they face any difficulties in teaching and learning, they will approach the entrepreneurial teacher face-to-face.

The school culture has a strong influence on the formation of the communication network. The Principal considers teachers' feelings in performing their duties. Therefore, he aims to facilitate teachers' working and continuing communication with other teachers. Formal communication serves as an information disclosure channel to review and identify the difficulties of implementing the new curriculum, while informal communication is a tube of glue by which the entrepreneurial teachers fix minor problems.

6.4.4 Unique findings: Visible recognition - Rewarding

The Principal emphasizes the importance of human resources at school. Therefore, he appreciates teachers' contributions to promoting new teaching and learning strategies. He records teachers' outstanding performance and discloses it on the school's intranet. This practice is real recognition for teacher performance. Furthermore, he reviews teachers' performance and records when considering promotions. He views promotion as a physical action through which he shows his respect for colleagues.

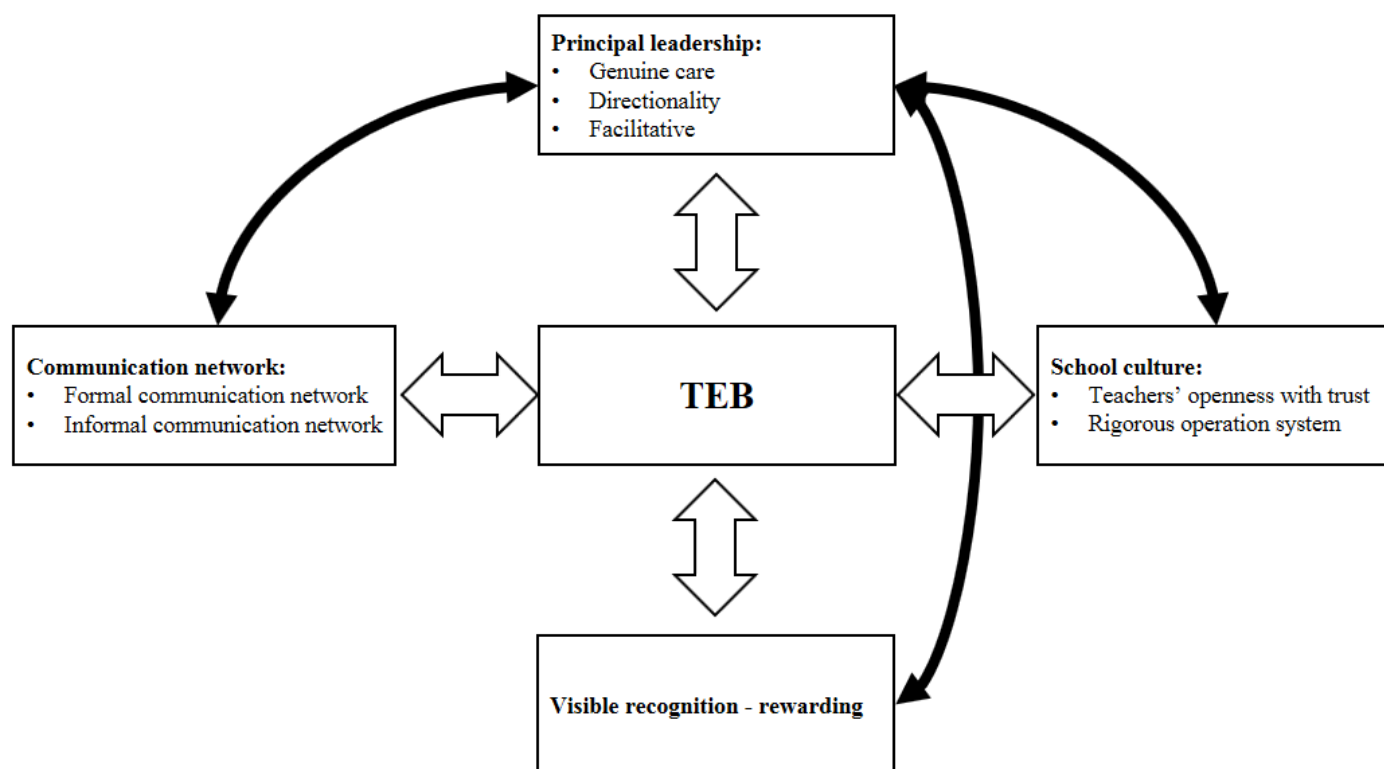
This reward system became a driver for the Vice-Principal and Subject Coordinator to perform their entrepreneurial behavior in promoting the new curriculum. They admitted that the reason for committing to the new curriculum was the prospect of promotion. Since the award, the Subject Coordinator has been promoted to the Senior Graduated Master, and the other teacher was promoted to be Vice-Principal.

6.4.5 Summary for the condition of enhancing TEB

The Principal's genuinely caring approach influences the organizational culture, communication network, and physical recognition, which enhanced TEB in leading the new curriculum. According to figure 6.6, the Principal employs a genuine care approach and rigorous operation system to manage his school. He decides the direction and monitors the operation with the rigorous operation system and formal communication channel. When a teacher has an outstanding performance, he will promote the teacher to a higher position.

In addition, his genuine care also cultivates an open culture for colleagues to voice their concerns through the formal and informal communication channels. This is beneficial for entrepreneurial teachers in promoting the school-based curriculum. They maximize the impact of informal communication to understand teachers' thinking and mobilize teachers to perform their duties. The Principal's leadership provides an open and rigorous working environment for the Vice-Principal and Subject Coordinator to develop the new curriculum at school. Although the Principal's character is different from the Principal in case two in that they present their ideas to teachers differently, they share the same purpose of leading and considering teachers' development.

Figure 6.6 Condition for enhancing TEB



6.5 Conclusion

In this chapter, TEB has a significant impact on teachers' performance. The successful experience of entrepreneurial teachers motivates teachers to be more proactive in generating new ideas for teaching and learning and to step out their comfort zones. The Vice-Principal and Subject Coordinator became the innovation facilitators at school and were responsible for developing an innovative project with proactive teachers. There are now many new projects.

Although the Vice-Principal and Subject Coordinator's entrepreneurial behavior is similar to the previous two cases, they have two distinctive entrepreneurial behaviors influencing their performance at school. First, genuine care is the major reason for their humility-confidence. Although the condition of genuine care is not the major factor for promoting the innovative school-based curriculum, it is a solid foundation for the entrepreneurial teachers to trust and work with teachers. In leading the curriculum or facilitating innovation system, they also display humility. Second, entrepreneurial teachers have the professional knowledge to strengthen their confidence in performing entrepreneurial behavior,

especially risk-taking, autonomy-enthusiasm, and innovation. Their confidence mobilizes teachers to take the initiative in developing and actualizing their innovative ideas for teaching and learning. Third, this is the first time that entrepreneurial teachers stated the importance of rewarding. This should be discussed in the next chapter.

Last but not least, this case echoes the new findings in case two that the directional persistence of coordination competency is crucial in performing the entrepreneurial behavior. Entrepreneurial teachers' professional knowledge enhances their confidence in deciding the direction of the new curriculum. In leading the curriculum and facilitating an innovation system, the directional persistence of the coordination competency enables entrepreneurial teachers to actualize their curriculum. This case also connects to the case two finding of a rigorous organization culture. This condition facilitates entrepreneurial teachers to monitor and mobilize teachers to implement the school-based curriculum.

To sum up, table 6.3 illustrates how the findings respond to the research questions. In the stable working environment, the entrepreneurial teachers are the activators who enhance teacher performance in adopting the new curriculum. Their students benefit from entrepreneurial behavior, especially with regard to self-management. They finally solved the problem of traditional pedagogy and the decline in students' intake.



Table 6.3 Responses to research questions

Research questions	Research niches	Findings	Summary
1. How do teachers and leaders understand and enact TEB and its components?	There is an insufficient understanding of the definition of TEB, which is valuable for me to explore this research niches in this study.	TEB: Autonomy-enthusiasm Risk-taking Strategic resources Coordination competency New items - Humility-Confidence Innovation	Significance of this chapter: <ul style="list-style-type: none"> - Teachers step out their comfort zones for more innovative projects Special findings of this chapter: <ul style="list-style-type: none"> - Genuine care for fostering trust - Professional knowledge for strengthening entrepreneurial behavior Connections with case two: <ul style="list-style-type: none"> - Professional knowledge strengthens entrepreneurial teachers' directional persistence - Rigorous system for constructing the foundation of the school-based curriculum
2. How do they perceive TEB's impact in schools?	Various meanings of impacts under the business and education context: 1. Diverse context between the business and education sectors	Direct impact: <ul style="list-style-type: none"> - Enhancing teachers' performance Indirect impact: <ul style="list-style-type: none"> - Nurturing students' growth 	
3. What school conditions enhance or challenge TEB?	Insufficient understanding of how conditions interact with TEB: 1. Lack of in-depth understanding of various conditions (e.g. Leadership style) 2. Needs of understanding the interactive relationship between schools' conditions and TEB	Principal leadership: <ul style="list-style-type: none"> - Directional persistence - Systematic opportunity identification - Empowerment coach and Rigorous monitor School culture: <ul style="list-style-type: none"> - Rigorous manner - Embedding trusting and open culture Communication network: <ul style="list-style-type: none"> - Formal communication - Informal communication Visible recognition - rewarding	



Chapter 7 – Cross Case Findings and Discussion: A Re-Conceptualization of TEB

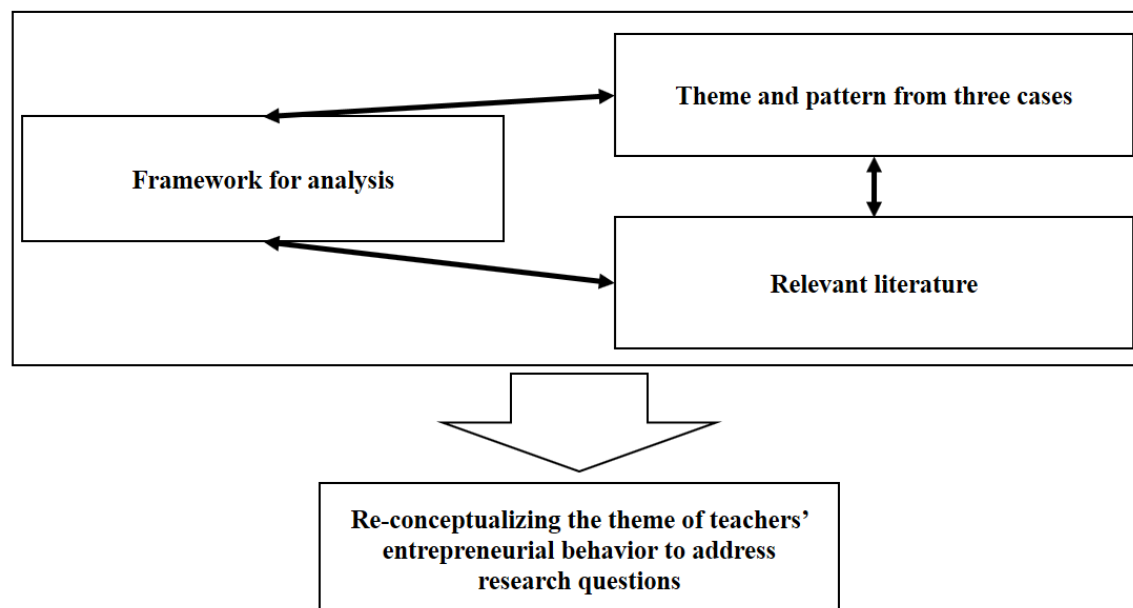
Purpose of This Chapter

In chapters four to six I described and analyzed the process of developing a school-based or subject-based curriculum through three different case studies. This chapter serves four primary purposes. First, it responds to the research questions. Second, it relates these responses to the relevant literature on how TEB is enacted and in what ways it contributes to a school, while also considering the impact the school conditions have on TEB. Third, it reviews the framework for analysis associated with the findings which are also presented in the discussion of three research questions. Finally, I discuss the theoretical implications of the study and the more specific practical implications of TEB in the education sector. At each stage, I keep the issues raised by the three research questions as a focal point of the discussion.

I reviewed previous studies to construct the framework for analysis. I also located three major research niches in the literature review. They are: insufficient understanding of the definition of TEB; insufficient understanding of how conditions interact with TEB; and the various meanings of impacts within the business and education sectors. I decided to conduct multiple case studies to gain an in-depth understanding of how TEB can impact upon the performance of a school.

I use my findings to address the research questions by conceptualizing TEB. Figure 7.1, echoes the analysis methodology in chapter three and demonstrates the process of re-conceptualizing the theme. According to the framework for analysis, I study and analyze each case. Relevant literature is employed to refine the themes of describing TEB, its impact and how it fits within the context of a school. This analysis synthesizes the main findings of TEB to establish a more holistic picture of how TEB is enacted in schools. By responding to the research questions, I further develop a proposed conceptual definition of TEB. Then, I look closer at how TEB interacts with school conditions and elaborate on the impact of TEB in schools.

Figure 7.1 The process of re-conceptualizing the theme of TEB



Authentic difficulties among cases

As section stated, I confined the difficulties of promoting the new curriculum of three cases from section 4.1.2.2, 5.1.2.3, and 6.1.2.4. Before addressing the research questions, I emphasized the difficulties among cases to indicate the real barriers of performing TEB in curriculum reform (see table 7.1).

7.1 Difficulties among cases

Categories of difficulties	Case 1	Case 2	Case 3
Technical issues	<ul style="list-style-type: none"> - Technical issues in video recording - Teacher overload in teaching and administration - Teacher resistance in employing new pedagogy 	<ul style="list-style-type: none"> - Technical issues in curriculum planning - Limited resources in supporting curriculum planning - Lack of teacher professional development 	<ul style="list-style-type: none"> - Teacher overload with limited free lesson - Teacher resistance in employing new pedagogy
Human relationship	<ul style="list-style-type: none"> - Teacher professional image - Excessive suggestion from teachers - Challenge from other subjects 	<ul style="list-style-type: none"> - Dealing with higher-ranked and more experienced teachers - Unification of whole-school-curriculum 	<ul style="list-style-type: none"> - Lack of collaboration among colleagues
External factor	NA	NA	<ul style="list-style-type: none"> - Decline of birth rate

According to table 7.1, most difficulties can be categorized into technical issues and human relationships. For the technical issues, the specific skills and knowledge needed about the new curriculum are the barriers for teachers. Teachers' resistance is also commonly found in all cases. Teachers hesitate to employ new pedagogies because they worry about unforeseeable results impacting their practice. Furthermore, teachers' high workload is a common feature among schools. Teachers are reportedly too busy handling teaching and administration work. They have limited time to connect with other teachers. This hurdle creates a barrier to understand and implement the new curriculum. To a certain extent, these difficulties reflect the reality of schools' practice in Hong Kong. Most teachers, who want to promote some new idea at school, need to overcome these barriers.

For the human relationship, three cases indicate diverse difficulties. For case one, the entrepreneurial teacher mainly deals with the communication inside and outside the subject department. She needs to lead her team members to make a consensus. In case two, the entrepreneurial teacher faces the challenge in communicating with senior teachers and making consensus among subject coordinators. She also needs to unify all subject curriculum in the same direction. In cases three, entrepreneurial teachers face soliciting working practice because of specialized knowledge in catering for students' needs. Although the above difficulties are different and reflect the variety of school contexts, there is a common feature of these difficulties - human relationship. All entrepreneurial teachers need to mobilize teachers to work with them. Therefore, I conclude that the context of human relationship barriers may be different, but the core difficulty is having consensus with teachers. Except for the human relationship, case three's entrepreneurial teachers also face the challenge of students' intake. This might be related to the background of the school that parents have a poor perception on special need school. This unfavorable factor becomes an urgency of change for entrepreneurial teachers in order to boost the students' intake. Compare with case three, case one and two are well-established that don't need to deal with this contextual difficulty.

7.1 Response to Research Question One

How do teachers and leaders understand and enact TEB and its components?

In this section, I use the study of how TEB is enacted in schools to propose an operational definition of TEB (section 7.1.1). The operational definition will be the foundation for me to understand the dimension and reciprocation (Blackstone, 2012) of defining TEB. Then, I discuss and conceptualize the definition of TEB by considering the theme of TEB and relevant literature (section 7.1.2).

7.1.1 Operational definition of TEB

Based on the findings of three case studies, I found that entrepreneurial teachers performed six major TEBs to accomplish the school-based or subject-based curriculum within their schools. I reviewed the framework for analysis to refine the operational definition of TEB. Mitchelmore and Rowley (2010) suggested that competencies and attributes of TEB should be clarified and separated. The ‘competency’ perspective implies that teachers demonstrate important skills that are needed to accomplish their school-based or subject-based curriculum. Meanwhile, the ‘attribute’ perspective presumes that qualities or characteristics (Arnon et al., 2007) that teachers have, lead to certain behaviors in developing the new curriculum. For instance, coordination competency is a competency by which teachers lead their team, while autonomy is an attribute teachers demonstrate by sacrificing their time to develop teaching and learning materials. In this section, I review the findings in light of literature. Figure 7.2 and Table 7.2 indicate the definition and features of TEB derived from this review. I, have summarized the figure to outline the operational definition of TEB as follows:

TEB refers to the way a teacher performs the competencies of coordination competency, strategic resources, and innovation with the attributes of autonomy-enthusiasm, risk-taking, and humility-confidence at school.

Figure 7.2 Operational definition of TEB

Competencies: —

Attributes: ---

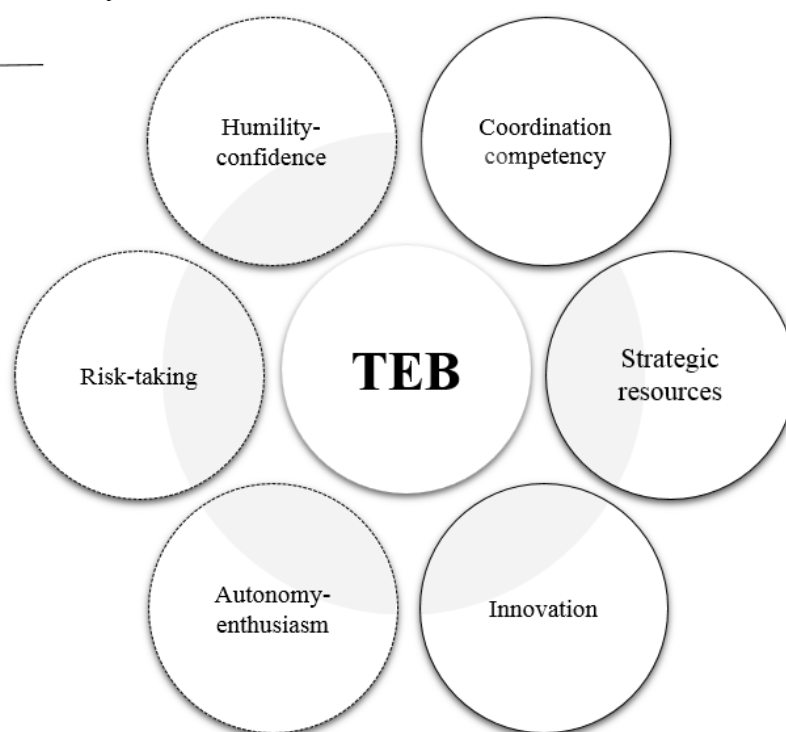


Table 7.2 Refining TEB with literature and findings

Teacher entrepreneurial behavior	Definition and features	Literatures and Findings
Coordination competency	Definition - Entrepreneurial teachers make decisions for school, cooperate with teachers, recognize colleagues' performance, and enhance staff morale as a leader.	Collay, 2011; Carpenter & Sherretz, 2012; Smylie et al., 1990; Vernon-Dotson & Floyd, 2012; York-Barr et al., 2004
	Features: - Sensible and well-organized - Direction persistence - Consensus among team members - Pilot sampling - Self-reflection - Lead as a role model	Findings: - Section 4.2.1.1, 5.2.4.1, and 6.2.5.3 - Section 4.2.1.1, 5.2.4.2, and 6.2.5.2 - Section 4.2.1.1 and 5.2.4.3 - Section 4.2.1.1, 5.2.4.4, and 6.2.5.3 - Section 4.2.1.1, 5.2.4.5, and 6.2.3.2 - Section 4.2.1.1, 4.3.2.2, 5.2.4.5, and 6.2.5.4
Strategic resources	Definition - Strategic resources has an overall view of seeking, gathering, and utilizing the internal and external network to generate resources which fit the needs of developing an innovative curriculum.	Black et al., 1994; van Dam et al., 2010; Vijaya et al., 2006
	Features: - Internal expertise - Expert support - Financial sources - Sharing teaching resources	Findings: - Section 4.2.1.5, 5.3.1.3, and 6.2.2 - Section 5.2.1.2, and 5.2.6 - Section 4.2.1.5, 5.2.3, 6.2.7, and 6.4.1.2 - Section 4.2.1.5 and 5.3.1.3
Innovation	Definition - Innovation is the integration of professional knowledge, resources, inspiration, and school context through which entrepreneurial teachers are continuously modifying and formalizing the curriculum until they have contextualized it for students.	Rogers, 1995; Schwartz, 2006; van Braak, 2001
	Features: - Contextualizing creativity - Scaling innovation and Knowledge transfer - Continuous modification	Findings: - Section 4.2.1.2, 5.2.6.1, and 6.4.2.1 - Section 4.2.1.1, 5.2.6.2, 6.2, and 6.2.5.1 - Section 4.2.1.1, 5.2.6.1, and 6.2.3.2
Autonomy-enthusiasm	Definition - Entrepreneurial teachers have an automatic intention to actualize their education goals and engage in the innovative curriculum without taking a break.	Deci et al., 2002; Krapp, 2002; Kunter et al., 2008
	Features: - Visionary - Autonomous - Self-sacrificing	Findings: - Section 4.2.1.4, 5.2.1.1, and 6.2.2 - Section 4.2.1.4, 5.2.1.2, and 6.2.2 - Section 4.2.1.4, 5.2.4.5, and 6.2.2
Risk-taking	Definition - Entrepreneurial teachers experience risks in pilot sampling, which motivates them to take the risk of promoting the innovative curriculum at school.	Isen et al., 1983; Jong, 2011; Ponticell, 2003; Trimpop, 1993
	Features: - Identify potential risk - Recognize opportunities	Findings: - Section 4.2.1.3, 4.3.2.3, 5.2.2, 5.4.1.3, and 6.2.1 - Section 4.2.1.3, 5.2.2, 6.2.1, and 6.4.1.3
Humility-confidence	Definition - Entrepreneurial teachers are confident in their professional judgment but demonstrate a humble manner.	Ackerman et al., 2006; Bowman, 2005; Dennis et al., 2005; Han et al., 2010; Hanson, 2017; Neto et al., 2018; Sendjaya et al., 2008
	Features: - Humility - Confidence - Genuine care	Findings: - Section 4.2.1.6, 5.2.5, and 6.2.6.2 - Section 4.2.1.6, 5.2.5, and 6.2.6.1 - Section 5.3.1.4, 6.2.6, and 6.4.1.1

From section 7.1.1.1 to 7.1.1.6, I present how I interpret the findings and review the

literature in order to refine the operational definition of the competencies and attributes of TEB.

7.1.1.1 Competency – Coordination competency

Coordination competency is the core theme of TEB demonstrated by entrepreneurial teachers achieving the goal of the new curriculum by leading and mobilizing their colleagues. Table 7.3 illustrates the integration between the framework for analysis and the findings. In the framework for analysis, I use the term ‘the ability to plan and manage a project’, which means dealing with management issues and addressing management difficulties while achieving the goal (Borasi et al., 2010; Bosam et al., 2010; Sayeed, 2003; Weber et al., 2013; Rekha et al., 2014; Rusu et al., 2014). The findings in all three cases show that entrepreneurial teachers strategically performed multiple leadership skills. Entrepreneurial teachers have a clear direction in developing the new curriculum with pilot sampling. Entrepreneurial teachers also listen to advice from the core team members or teachers and modify their direction and plans until they reach a consensus. Most importantly, they also lead as a role model in demonstrating the practice of the new curriculum. These behaviors connect to the meaning of coordination competency.

Coordination competency is the process by which teachers, individually and collectively, influence their colleagues, principals, and other members of their school community to improve teaching and learning practices with the aims of promoting student learning and achievement (York-Barr et al., 2004), and school performance (Carpenter & Sherretz, 2012; Vernon-Dotson & Floyd, 2012). This study found that teachers with this competency were able to collaborate, inquire, and form a partnership with their colleagues (Collay, 2011).

In this study, entrepreneurial teachers have a clear direction in developing the new curriculum. They are not only good at dealing with management issues through their sensible and well-organized behavior, but they also advocate new teaching and learning practices in their schools. From their point of view, equipping and mobilizing teachers to engage in the new curriculum is the crucial issue. Therefore, entrepreneurial teachers consult teachers in order to understand their concerns when adopting new teaching and

learning strategies and modifying the curriculum. Then, entrepreneurial teachers reflect upon their strategies for the new curriculum. The reflective thinking process is paramount for entrepreneurial teachers because most of the innovative ideas and coordination are consolidated in it. The performance of the above shows that entrepreneurial teachers played the role of being facilitators as well as leaders (Smylie et al., 1990). Entrepreneurial teachers' leadership skills fulfill the meaning of coordination competency (York-Barr et al., 2004) in that they made decisions for the school, cooperated with colleagues, recognized colleagues' performance and enhanced staff morale as a leader.

One point which is pivotal in the coordination competency is that the process of coordinating the new curriculum also involves stimulating others teachers' reflection. Entrepreneurial teachers performed their coordination competency to stimulate their team members' reflection in accomplishing the school-based curriculum. As Brookfield (2017) explained, the reflective thinking process is the combination of problem formulation, individual and collective analysis of experience, and compilation of suggestions for practice. In general, entrepreneurial teachers identified the most pressing problems they encountered in the new curriculum and conducted regular meetings with teachers. Then, entrepreneurial teachers and teachers systematically searched their individual experiences as learners and teachers for clues as to how the problem could be dealt with. Entrepreneurial teachers consolidated teachers' experience and modified the curriculum with teachers. The above coordination practice is a reflective process by which the teacher reflects upon teaching and learning. Reflective thinking is obviously embedded in their coordination competency.

Reflective thinking was an unexpected finding in investigating entrepreneurial teachers' coordination competency. Coordination competency and reflective thinking were inseparable and generated a synergy between promoting teachers proficiency in teaching and learning and cultivating innovative ideas. Entrepreneurial teachers play the facilitating role in triggering the reflective thinking process. Being leaders of the curriculum, entrepreneurial teachers, who have a clear direction in curriculum design, coordinate, discuss and decide multiple matters in a group (Pharo et al., 2012). This is the foundation



for formalizing and promoting reflective dialogue which leads to reflective learning among teachers (Brockbank et al., 2007). The role of being a curriculum leader empowered the entrepreneurial teachers to perform their coordination competency while formalizing the reflective practice among teachers. All teachers' reflection involves analyzing, making sense of what has happened, and recognizing implications for the teaching profession. This reflective practice ultimately guides entrepreneurial teachers and teachers to a balanced perspective on purpose and progress, and integrating other peoples' experience and advice, when modifying the school-based curriculum (Tsui et al., 2017). For instance, in case one mathematics teachers found that the newly developed teaching materials were funny and meaningful for them to teach. They treated developing teaching materials as an opportunity to cater to students' individual needs. Although they foresaw the risks of the changes, they took the initiative by sacrificing personal resources and time to try various innovative ideas, such as drama, videos, mathematics cards, etc. In case two the subject coordinators were willing to continue revising their curriculum to cater for students' learning diversity. General studies and English were now in the second phase of curriculum reform. In case three entrepreneurial teachers and teachers formed a facilitating system to generate more innovative projects at school. They continuously developed new projects for students.

Although the coordination competency is the core competency for entrepreneurial teachers actualizing the new curriculum at school, it is not the only competency to contribute to developing the school-based and subject-based curricula. Entrepreneurial teachers also perform other competencies to obtain their goal of the new curriculum. These competencies are essential elements in creating synergy with the coordination competency.

Table 7.3 Re-conceptualize the ability to plan and manage a project

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
The ability to plan and manage a project - Deal with management issues and lead the way in addressing management difficulties to achieve the goal	Entrepreneurial teachers are: - Visionary in directional persistence - Sensible and well-organized in managing a team - Conducting pilot sampling to create successful experiences - Leading by being role models to convince teachers - Facilitating stimulation of teachers' reflection	Competencies - Coordination competency Entrepreneurial teachers make a decision for their school, cooperate with teachers, recognize colleagues' performance, enhance staff morale, and stimulate reflection as a leader.	Redefine the scale of TEB in coordination competency.

7.1.1.2 Competency – Strategic resources

Strategic resources are the accelerator for generating innovative ideas and performing coordination competency in schools. Table 7.4 shows that I preliminarily defined 'seeking external resources' as one of the TEB, which asserted that entrepreneurial teachers tend to expand the network for gathering resources (Karen et al., 2010; Vijaya et al., 2006) to support their innovative school-based or subject-based curriculum.

Furthermore, I found that teachers strategically use the resources to form a comprehensive school-based curriculum with colleagues. Strategic resources mean that the leader oversees the dynamics of the creation of organizational resources, especially strategically essential factors, such as network type, available substitutes, and effective relationships inside and outside the organization (Black et al., 1994). Teachers with this competency review the needs of developing an innovative curriculum at school and intentionally construct the internal and external network to gather the resources needed. This includes professional knowledge of new teaching strategies, monetary support, and technical skills to handle the practical problems.

In our study, entrepreneurial teachers recognized their limitations in developing the new curriculum. They connected with professional parties or recruited professionals to join their

team. This allowed them to gain experience from professional parties and generated inspiring ideas. In case three the entrepreneurial teachers applied to the QEF and the Education Bureau support program to implement their curriculum. In case one, the entrepreneurial teacher invited internal expertise to solve the technical problems. Obviously, the entrepreneurial teachers above gathered resources with strategic purpose.

Compared with seeking external resources; strategic resources has an overall view of seeking, gathering, and utilizing the internal and external network to generate resources which fit the needs of developing an innovative curriculum. Therefore, I decided to employ the term ‘strategic resources’ instead of seeking ‘external resources’ as the TEB.

Table 7.4 Re-conceptualize seeking external resources

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Seeking external resources - Expand network for gathering resources	Entrepreneurial teachers seek: - Internal expertise and assistance - External expertise and assistance - Other schools’ materials - Quality Education Fund support	Competencies – Strategic resources Strategic resources has an overall view of seeking, gathering, and utilizing the internal and external network to generate resources which fit the needs of developing an innovative curriculum.	Redefine the scale of TEB.

7.1.1.3 Competency - Innovation

This study clarifies the process of generating an innovative idea to explain the meaning of innovation, which is shown in table 7.5. With regard to the literature, teacher innovation was evident in developing new curricula and pedagogy in teaching (Hayat et al., 2015; Oplatka, 2014), and, innovation was the outcome of new ways of doing the old or new task (Wiklund et al., 2003; Mumford, 2011).

In this study, I found that innovation is the process of entrepreneurial teachers adapting and contextualizing innovative ideas in school into a new curriculum (Khprami et al., 2018). Entrepreneurial teachers with a high degree of innovativeness have explicit knowledge and are willing to adopt innovative teaching and learning strategies (Braak, 2001; van Braak

2001; Rogers, 1995). They shift away from the paradigm and challenge the existing practice in teaching and learning. Therefore, they actively seek and acquire new teaching and learning pedagogy. With the inspiration of other innovative ideas, they even contextualized these new ideas into their teaching and learning strategies (Schwartz, 2006) in order to fulfill both student and school needs.

For instance, in case one the school gained ideas for their innovative subject-based curriculum from educational television. In case two, the school gained experience from EDB and expertise from the university. In case three, the school generated ideas from the occupational and musical therapists' perspectives. The entrepreneurial teachers have a high willingness to adopt these innovative ideas. They learn from other parties and employ trial and error as learning through doing. The experience gained from learning through doing assists entrepreneurial teachers to modify and contextualize the curriculum for their schools and students.

According to these findings, the research realizes that the innovation of TEB is not about an original teaching and learning pedagogy. Conversely, innovation is the integration of professional knowledge, resources, inspiration and school context that causes entrepreneurial teachers to continuously shift away from the paradigm and formalize the curriculum until they have contextualized it for students.

Table 7.5 Re-conceptualize the meaning of innovation

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Innovation - Was the outcome of new ways of doing the old or new task	Entrepreneurial teachers are: - Contextualizing expertise and ideas into the school context - Transferring professional knowledge in teaching - Continuously modifying the ideas - Scaling innovation to promote cross-subject learning	Competencies – Innovation Innovation is the integration of professional knowledge, resources, inspiration and school context that causes entrepreneurial teachers to continuously shift away from the paradigm and formalize the curriculum until they have contextualized it for students.	Provide concrete explanation on education innovation.

7.1.1.4 Attribute - Autonomy-enthusiasm

Entrepreneurial teachers are enthusiastic about developing an innovative curriculum with a strong vision in education. Table 7.6 explains how I refine TEB in autonomy-enthusiasm. With regard to the framework for analysis, I adopt ‘autonomy with a positive attitude’ as TEB, which means teachers take the initiative to persistently complete an assigned task or personal goals (Hayat et al., 2015; Oplatka, 2014). As section 4.2.1.1 mentioned, we found that there are slight differences between the findings and the framework for analysis. According to the framework for analysis, teachers have a positive attitude in facing setbacks (Rekha et al., 2014). However, our findings reveal that entrepreneurial teachers are brave in developing an innovative curriculum rather than positively facing setbacks.

All entrepreneurial teachers have an educational goal in their career path. They wish to promote the joy of learning for students and assist students to overcome learning diversity or difficulties. In order to fulfill their goal, they automatically investigate the possible resources and pedagogy. Some of them even seek expert assistance or consult colleagues. The above behavior indicates that entrepreneurial teachers are driven by the goal. This is Goal-Driven Autonomy, which enables people to take the initiative to respond more effectively to environment changes (Klenk et al., 2012).

In addition to taking the initiative, entrepreneurial teachers are enthusiastic about sacrificing their time and resources in order to commit to developing an innovative curriculum which supports students' learning and development. Enthusiasm is an effective disposition, (Kunter et al., 2008) the entrepreneurial teachers experience enjoyment and excitement when engaged in helping students. In fact, entrepreneurial teachers face many obstacles in implementing the curriculum. Colleagues might resist the changes in the teaching pedagogy, in which case, entrepreneurial teachers revealed that they overcame the difficulties with their endurance and enthusiasm. They decided to face the obstacles by continuously modifying the curriculum with the help of trusted teachers. They believed in their education goal, and finally found satisfaction in the pilot sampling. The positive students' feedback is a motivation for them to persist in promoting the curriculum at school.

The education goal encompasses entrepreneurial teachers' self-interest, (Krapp, 2002) and their self-determination (Deci et al., 2002) means that they take the initiative to actualize it by persistently promoting their innovative curriculum (autonomy). However, enthusiasm is the behavior that teachers and principals observed at school. They found that entrepreneurial teachers engage in developing the new curriculum automatically. Therefore, autonomy-enthusiasm is the appropriate theme to describe TEB, which indicates how teachers' education goal and character led to a high engagement.

Table 7.6 Re-conceptualize autonomy with positive attitude

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Autonomy with positive attitude - Persistently take the initiative to complete an assigned task or personal goals.	Entrepreneurial teachers are: - Motivated by education vision - Automatically trying new things - Sacrificing personal time and resources to develop the new curriculum (Enthusiasm)	Attributes - Autonomy-enthusiasm Entrepreneurial teachers have an intention to actualize their education goal and automatically engage in the innovative curriculum.	Clarify the interaction between autonomy and enthusiasm

7.1.1.5 Attribute - Risk-taking

Risk-taking is essential for the entrepreneurial teachers to promote the innovative

curriculum to colleagues. In general, the findings are similar to the framework for analysis, which is shown in table 7.7. Entrepreneurial teachers treat risk-taking as an act of seizing opportunities (Dess et al., 2005; Weber et al., 2013). They identify the problems of traditional teaching pedagogy at school and view these problems as an opportunity to improve the teaching strategy. They also understand that the reform may have a negative impact on students' performance, which is a potential risk for the school. They balance long-term benefit with the risk of redesigning the curriculum for students. As a result, they decide to seize opportunities to promote reform at school. This is typical risk-taking behavior.

Alongside echoing the literature, this study also contributes to clarifying the meaning of risk in the education sector. In the business sector, risk is understood to stand for a potential loss in terms of money or of a business venture. However, there was no specific description of risk in education research. Trimpop (1993) tried to clarify the risks in education into the loss, significant loss, and uncertainty. He found that most risks in education were the uncertainty, which resided both in the probability of outcomes and losses occurring, and in the perception of their value. Ponticell (2003) had a more specific explanation for Trimpop's definition that the uncertainty risk was to test the boundaries of teachers' conservatism in adopting innovative teaching. This study connects to Trimpop's explanation, the entrepreneurial teachers' concern in promoting the innovative curriculum is their colleagues' resistance rather than the negative impact on students' performance. They thought that the negative impact of students' academic performance could be fixed by remedial action if the new curriculum did not work. From their point of view, the risk is the uncertainty of their colleagues' responses, which in turn influences the effectiveness of the innovative curriculum. They worry about the risk of teachers' resistance. However, they treat this resistance as an unavoidable and insignificant loss, which is acceptable.

Furthermore, this study also found that autonomy-enthusiasm and risk-taking are inter-related. Jong (2011) found that the higher the characteristic of autonomy, the more risk-taking the person was in the business sector. A similar study of the education sector also found that teacher enthusiasm combined with successful experience is favorable to their

risk-taking (Isen et al., 1983). In this study, I found that entrepreneurial teachers conducted pilot sampling to test the effectiveness of the innovative curriculum. Most pilot samplings were conducted either in their class or in a core team member's class. This is an example of their autonomy action. With the support of successful experiences in pilot sampling, they became more confident about convincing resistant teachers to participate in the implementation of the new curriculum.

I decided to employ the original theme of 'risk-taking' to describe TEB because entrepreneurial teachers foresee the potential risk and are willing to bear a calculated risk in order to seize the opportunity to promote the innovative curriculum for students. The features of their entrepreneurial behavior match the definition of risk-taking in the business sector.

Table 7.7 Re-conceptualize the meaning of risk-taking

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Risk-taking - Treat risk-taking as an act of seizing opportunities	Entrepreneurial teachers are: - Realizing the potential risk - Treating risk as an opportunity - Conducting pilot sampling to test the risk	Attributes - Risk-taking Entrepreneurial teachers experience the risk in pilot sampling, which motivates them to take the uncertainty risk to promote the innovative curriculum at school.	Support the framework for analysis with findings Clarify the meaning of risk in the education sector.

7.1.1.6 Attribute - Humility-confidence (New)

Humility-confidence is a surprising result of this study, as shown in table 7.8. In the previous study of TEB, no entrepreneurial teacher performed their entrepreneurial behavior while emphasizing a humble and confident manner. However, in all three cases, the entrepreneurial teachers consistently demonstrated their humility-confidence attribute in their leadership of teachers. I assume that this might be a unique attribute of entrepreneurial behavior in the education sector.

Traditionally, humility is the core attribute of teachers in the education sector (Bowman,

2005). Successful leading teachers stay true to their beliefs with humility in their practice and continually work with other teachers to improve students' learning (Ackerman et al., 2006). In our study, I also found that humility is a common practice for entrepreneurial teachers when working with their colleagues. Being a leader of the new curriculum, they seldom emphasized their own achievement in the development of the school-based curriculum; instead, they appreciated their colleagues' contributions and cherished their advice. These actions are the humble behavior by which entrepreneurial teachers show respect for colleagues and acknowledge their contribution as part of a team (Dennis et al., 2005). They act quietly without deliberately seeking public attention (Sendjaya et al., 2008). Entrepreneurial teachers intentionally behave humbly because they understand that a stance of humility is the foundation for advocating a reform at school. (Borko et al., 2009). Other teachers' feelings is their primary concern in implementing and promoting the innovative new curriculum. The humility behavior of entrepreneurial teachers fosters a positive relationship with teachers (Han et al., 2010), which ensures that teachers are willing to implement the curriculum.

This study also found that entrepreneurial teachers are confident in presenting and implementing their innovative curriculum with a humble manner, which can promote the effectiveness of school reforms (Wheatley, 2002). Neto et al. (2018) and Hanson (2017) studied the influence of teachers' confidence in their profession. They found that teachers' confidence has a positive impact on encouraging teachers to perform and commit to the innovative behavior. They would convince teachers and enhance the team performance in adopting a new curriculum. In this study, all entrepreneurial teachers are highly confident in their innovative curriculum. Although they motivated colleagues to participate in their new curriculum in a humble manner, teachers recognized the entrepreneurial teachers' confidence in performing and leading the innovative curriculum. They found that entrepreneurial teachers led their team as a role model with humility and confidence. When there was a challenge from resistant teachers, entrepreneurial teachers would defend their curriculum humbly but confidently.

I recognised entrepreneurial teachers' attributes of humility and confidence in leading the

new curriculum. These attributes lead them to perform specific entrepreneurial behaviors, such as coordination competency and innovation. Both attributes work hand in hand. Therefore, I decided to name ‘humility-confidence’ as TEB.

Table 7.8 Re-conceptualize the new findings as humility-confidence

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Not found in literature	Entrepreneurial teachers: <ul style="list-style-type: none"> - Humbly appreciate teachers’ contributions to the curriculum - Confidently convince other teachers to participate in the curriculum - Show genuine care for teachers’ feelings 	Attributes - Humility-confidence Entrepreneurial teachers are confident in their professional judgment with a humble manner.	New findings for TEB

The unexpected finding of the humility-confidence attribute aroused my interest in the reasons why entrepreneurial teacher performs this behavior. To begin with, I suspected that the cultural background was the primary reason for this unexpected finding. According to Yin’s study (2013), humility-confidence was also found in the collaboration among teachers in Mainland China. Studies repeatedly indicated that high collectivism with harmony (Bush et al., 2000) is a significant characteristic of Chinese culture (Ribbins et al., 2006; Dimmock et al., 2005). Yin concluded that Chinese teachers preferred to maintain the harmonious working environment among teachers in order to pursue the collectivism. The character of Chinese teachers’ obedience to superiors, teachers’ collaboration with colleagues, and teachers’ facework in avoiding conflict were the common features in their humility-confidence behavior. Nonetheless, our study was only partially aligned with Yin’s findings.

Although all entrepreneurial teachers also worked in a Chinese culture that was high in collectivism and high in power distance as in other Asian countries (Hofstede, 2001), they stated that teachers were not obedient at the beginning in respecting entrepreneurial teachers, even though entrepreneurial teachers were in charge. Teachers’ primary concerns

were their teaching load and the harmonious working environment among teachers. To address teachers' concerns, entrepreneurial teachers decided to present their ideas humbly and confidently in order to mobilize their colleagues in pursuing collectivism while maintaining the harmonious working relationship with teachers. They decided to promote the 'saving face' issue by implementing the curriculum while maintaining the harmonious relationship (Yin et al., 2012). To a certain extent, entrepreneurial teachers' humility-confidence behavior aligned with Yin's study in that teachers seldom directly expressed their concerns to others because undesirable conflicts between teachers and superiors would occur (Yin, 2013). Entrepreneurial teachers were struggling between collectivism and a harmonious working relationship. They tried to perform humility-confidence behavior to maintain the harmonious relationship with the teachers, while they still wanted to mobilize colleagues. Entrepreneurial teachers' humility-confidence behavior in promoting the new curriculum involved pushes, pulls and nudges between collectivism and harmony.

However, the findings of western studies rejected my speculation on the culture factor. The culture was not the primary factor in forming humility-confidence behavior for entrepreneurial teachers. The pushes, pulls and nudges of humility-confidence behavior also connected to the western studies in terms of civility. In the school environment, scholars can often observe islands of civility surrounded by a sea of indifference, which leads teachers to identify ways and opportunities to break down walls and remove barriers (Seyfarth, 1999). Teachers prefer to have formal, polite and courteous behavior and discussion with colleagues and leaders (Nichols, 2010). They aim to develop a sense of harmonious respect among teachers, which promotes a culture of collectivism.

The findings of Chinese and western studies indicated that teachers also exhibit humility-confidence behavior in leading their team. It seems that cultural differences were not the primary reason for performing this behavior. However, all studies and our findings indicated that collectivism with harmony was the ultimate goal in mobilizing teachers to perform within the new curriculum. The teachers, who were in charge of reform, were already in the habit of performing the humility-confidence behavior. I suspect that this

behavior might be a necessary feature for high-level teachers in the education sector. As an entrepreneurial teacher, they took the initiative to work with teachers to actualize their innovative ideas. They most likely became the teacher-in-charge of a certain project. To achieve collectivism in the new project, entrepreneurial teachers also used humility-confidence behavior in leading their team. Therefore, I can identify the humility-confidence behavior from this study.

7.1.2 Conceptual definition of TEB

Having refined the operational definition of TEB, I reviewed the literature and findings in order to describe the conceptual definition of TEB. The synthesis of the findings and TEB suggest that the conceptual definition of TEB is as follows:

TEB is a process by which a teacher demonstrates entrepreneurial competencies and attributes in actualizing an innovation at school.

In this section, I explain the rationale of describing the conceptual definition of TEB.

When re-describing a conceptual definition, it can be said to have ‘dimension’ where there is multiple ‘reification’ that makes up a single concept (Blackstone, 2012). ‘Dimensions’ was the combination of several reifications into a category of measures. ‘Reification’ assumed that abstract concepts exist in some concrete, tangible way. To identify the dimension and reification, inductive and deductive approaches are needed. As chapter three mentioned, I employed a mixed approach to describe the conceptual definition of TEB in this study, which generated dimension and reification. I used the inductive approach to re-conceptualize the conceptual definition of TEB (Miles et al., 2014; Furman, 1990). Table 7.9 shows the process of re-conceptualizing the definition of TEB. Based on the framework for analysis, I collected data and located the pattern from the context. Second, I adopted the deductive approach (Glaser, 2012) to name the theme and pattern from the data. Third, the literature served as the theoretical element for me to re-conceptualize the meaning. I trained backward and forward along the framework for analysis, theme, and pattern, and relevant literature to identify the reification and categorize the dimension. Finally, I traced

back to the context, such as time, place, and people, to polish the definition of TEB with appropriate context.

In practical operation, I went through the analysis process and defined six operational TEBs. It served as the reification in defining the conceptual definition. Based on the reification, I further identified two main dimensions of conceptualizing the definition of TEB. They are teacher competencies and attributes. To polish the definition of TEB with appropriate context, the findings suggest that the process of developing the new curriculum is the platform for the entrepreneurial teacher to perform their entrepreneurial behavior. Most importantly, the findings also echo the literature in that the process of performing the entrepreneurial behavior in developing the new curriculum is also the process of entrepreneurial teachers' personal development (Pantea, 2016; Smyth 1999; Sukarieh & Tannock 2009).

Based on the above analysis, I confined the standard sentence structure for the conceptual definition of TEB. The definition is the mixture of previous studies, in-depth understanding of educational context, and relevant literature. I conclude that:

TEB is a process by which a teacher demonstrates entrepreneurial competencies and attributes in actualizing an innovation at school.

Table 7.9 Re-conceptualize the conceptual definition of TEB

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Temporary conceptual definition TEB is a process of personal development in which a teacher demonstrates entrepreneurial behavior in creating new teaching and learning strategies at school.	Entrepreneurial teachers: <ul style="list-style-type: none"> - perform competencies and attributes as entrepreneurial behavior - actualize the curriculum reform at school 	Conceptual definition TEB is a process of personal development in which a teacher demonstrates entrepreneurial competencies and attributes in actualizing curriculum reform at school.	Clarify entrepreneurial behavior into two dimensions and the context of performing entrepreneurial behavior.

7.1.3 A summary of the response to research question one

This study addresses the research niche of an insufficient understanding of the definition of TEB. The multiple-site case study provides an in-depth investigation to help in the refining of the operational definition of TEB. This analysis helped me to recognize the essential element in conceptualizing the conceptual definition of TEB within the school context. I found that entrepreneurial teachers acquire and perform different entrepreneurial behaviors according to the response to the various situations arising when actualizing their curriculum reform.

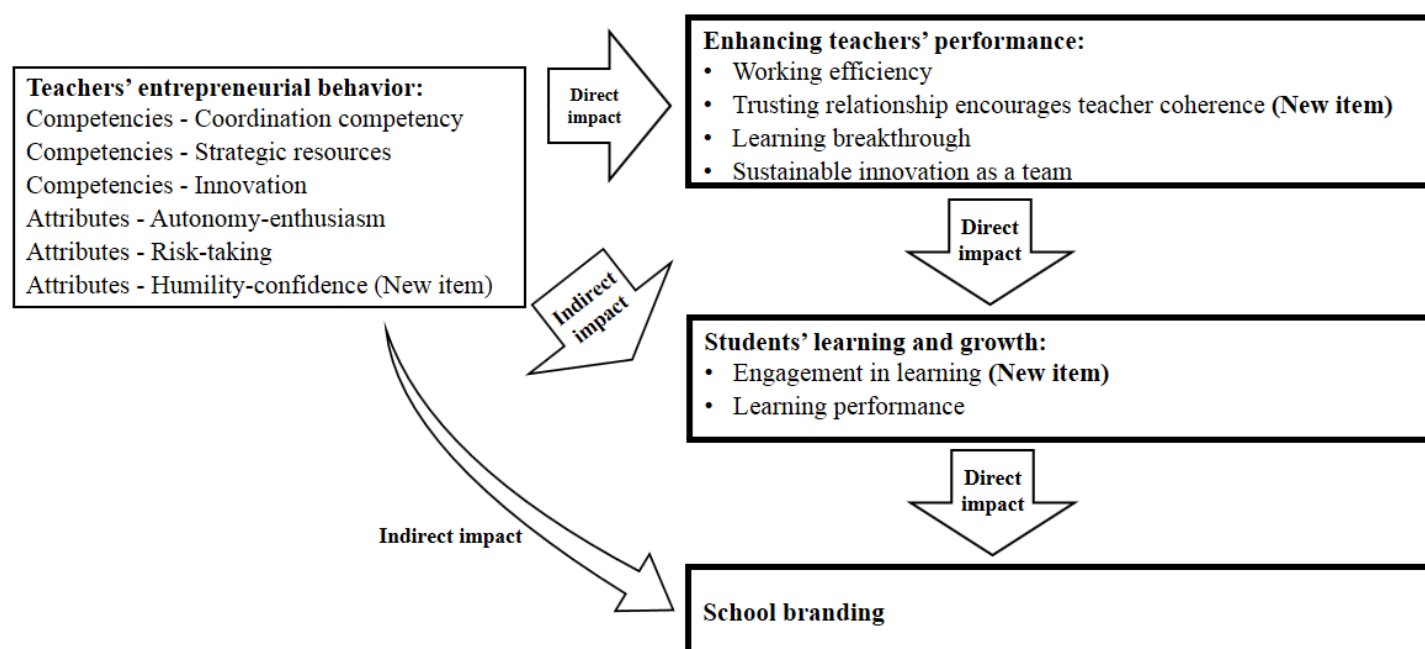
In addition, this study clarifies that the two concepts of humility-confidence competency and reflective thinking competency are the missing links in studying TEB. An entrepreneurial teacher purposefully shows humility-confidence to work with team members and creates a reflective atmosphere among teachers, this is because entrepreneurial teachers have the self-educational goal in their career. They need this entrepreneurial behavior to develop an innovative curriculum or pedagogy which has to be continuously modified. In order to address the importance of these new findings, further verification may be needed to validate the application of humility-confidence and the process of reflection in other societies and contexts.

7.2 Response to Research Question Two

How do they perceive TEB's impact in schools?

I preliminarily identified five impacts of TEB from the previous studies. When I collected data in the school context, I found that in the initial analysis these impacts could be classified into three audiences: teachers, students, and schools. I continuously modified the interview questions and asked probing questions to understand the impact of these audiences. As a result, I realized that the impacts of TEB on the three audiences are both direct and indirect (see figure 7.3). To further understand the impact, I re-conceptualized the impact of TEB from section 7.2.1 to 7.2.3.

Figure 7.3 Impact of TEB



7.2.1 Direct impact - Enhancing teachers' performance

By examining the findings of the three cases, I realized that entrepreneurial teachers have a direct and immediate impact on teachers once they initiate any innovative idea at school. Most teachers experienced a breakthrough process in teaching and learning with entrepreneurial teachers. In this section, I discuss the impact on teachers by considering the process of breakthroughs in teachers' performance, which is shown in table 7.10.

7.2.1.1 Working efficiency

Entrepreneurial teachers enhance teachers' working efficiency when they perform entrepreneurial behavior in leading their colleagues. In the framework for analysis, previous studies indicated that entrepreneurial behavior enhanced colleagues' teaching performance (Chand et al., 2006) because they gained experience from entrepreneurial teachers (Neto et al., 2017). These studies provide a general understanding of the impact on the teacher only in terms of their overall performance.

In addition, this study concretely affirms previous empirical studies. Entrepreneurial teachers perform coordination competency in leading their team which enhances teachers' working efficiency. All entrepreneurial teachers aligned with the rigorous system at school. When the original rigorous system didn't fit their needs, they constructed a system to monitor the process of implementing the innovative curriculum. They committed to maintaining and even enhancing the efficient and effective educational system (Evans, 1996) at school. Within the rigorous system, entrepreneurial teachers took the initiative or responsibility to monitor the implementation aligned with the primary direction.

Entrepreneurial teachers' coordination competency motivates them to maintain and develop the rigorous monitoring system in order to promote teachers' working efficiency. Having considered the original meaning of enhancing teaching performance, I decided to employ 'enhancing working efficiently' as the impact of TEB on teachers. Teachers are not assessed solely on standard performance requirements in teaching but also on their efficiency in handling other teaching duties.

7.2.1.2 New item - Trusting relationship encourages teacher coherence

This study finds that every case has high teacher coherence. This is an unexpected finding in this study because no empirical study investigated the relationship between TEB and team coherence within the organization. All teachers stated that they are willing to work with colleagues, especially the entrepreneurial teacher.

With regard to the teachers' feedback, I spotted that all teachers mentioned 'trust the

entrepreneurial teacher' many times in their interviews. They emphasized that the reliable performance of entrepreneurial teachers convinced them to participate in implementing the school-based curriculum. They are willing to work continuously with entrepreneurial teachers because entrepreneurial teachers cherish their working relationship with them. This finding indicates that a trusting relationship is cultivated in the process of developing the school-based curriculum with entrepreneurial teachers. At first, the entrepreneurial teachers' autonomy-enthusiasm enhances the teachers' commitment as a team (Dee et al., 2006) because teachers are impressed by their commitment to implementing the new curriculum. Trust is formed gradually through collaboration with each other (Tschannen-Moran et al., 1997), because good communication, such as sharing objectives and support with honesty, instills trust among collaborators in the collaboration process (Turner, 2010), (Arenson, 2015). Furthermore, entrepreneurial teachers, who have a reliable competence, also convince teachers to trust them (Brücknerová et al., 2017). Most importantly, all entrepreneurial teachers have good intentions in developing the materials, they are not just pursuing self-aggrandizement. They conduct a comprehensive review of the whole school to find where there is room for enhancement, which then becomes the reference for them to develop a sharp insight in developing the school-based curriculum. Then, entrepreneurial teachers perform a coordination competency in forming a standardized operating system which monitors subject routines and specialized tasks. Being promising leaders in the curriculum, entrepreneurial teachers cultivated a positive experience of cooperation, which promoted teachers' collaboration and coherence (Hickey et al., 2005). As a result, most teachers are self-disciplined in fulfilling their duties. This is the persuasive evidence which convinces other subject teachers to work with them because they admire entrepreneurial teachers' insightful curriculum direction and the accordance between their words and actions.

Furthermore, an attribute of humility-confidence is also the core element of fostering trust among teachers (Hoy, 1992; Brücknerová et al., 2017). According to their explanation, an attribute of humility-confidence was about being helpful and kind in supporting teachers at school, which sets the tone for greater trust among teachers. In the interviews, teachers explained that entrepreneurial teachers have a clear focus in developing the school-based

curriculum with subject teachers. Meanwhile, they understand that some teachers may not visualize how to adopt the new teaching and learning strategies at the beginning. Therefore, entrepreneurial teachers decide to be the role model for teachers who can then imitate their teaching pedagogy. They work with an experienced teacher to form a core team in developing a new pedagogy. This is the evidence of TEB in the coordination competency, strategic resources, and risk-taking. Based on successful pilot experience, entrepreneurial teachers worked with teachers and monitored the process of implementing the curriculum. Their guidance enriched teacher understanding of the implementation strategies. Although teachers spent a lot of time developing the school-based curriculum, they found that entrepreneurial teachers lead them to fulfill the direction of the school-based curriculum within the rigorous operating system. Teachers also stated that they enjoyed the process of working with them because they cared about their difficulties. In the findings, teachers who sensed and appreciated the humble leadership style emulated the entrepreneurial teachers' humble behavior (Owens et al., 2016). Teachers cherished the collective humility in their school.

Entrepreneurial teachers have an intention to spread via social interaction with teachers, which might enhanced teachers' coherence at schools while maintaining collective humility. In all cases, all team teachers emphasized that they prefer to perform their duties in teaching and learning with colleagues humbly, because they cherish the habit of humility with the entrepreneurial teachers. Entrepreneurial teachers, who understand that arrogant and pushing attitude may draw teacher resistant, decide to work seriously with others and tend to promote a positive impact on the team's performance (Owens et al., 2016). As teachers stated that this coherent relationship among colleagues is based on the trustworthy experience of working with entrepreneurial teachers. Teachers appreciate the entrepreneurial teachers' reliable coordination and experience the entrepreneurial teachers' supportive stimulation or assistance. These memorable collaboration experiences nurtured some teachers' confidence to step out of their comfort zones.

7.2.1.3 Learning breakthrough

Entrepreneurial teachers encourage teachers to learn through doing and step out their

comfort zones in their teaching career. The framework for analysis stated that the entrepreneurial employees promoted organizational learning in their companies (Molina et al., 2009; Vishal et al., 2014; Vihaya et al., 2006; Cope, 2000). However, the way of promoting organizational learning is not concretely clarified. This study has similar findings, but it spells out the way to promote organizational learning.

This study shows that entrepreneurial teachers facilitate teachers to learn through doing. As people who exhibit risk-taking and autonomy-enthusiasm, entrepreneurial teachers took the initiative to adopt new teaching and learning pedagogy in developing the curriculum. Entrepreneurial teachers, as leaders of the curriculum, performed their coordination competency in monitoring and supporting colleagues. Teachers, who worked closely with them, had the opportunity to learn and adopt the innovative pedagogy into their own teaching. Entrepreneurial teachers had a sensible and well-organized system for collecting data and encouraging teachers to reflect upon the implementation process (Wayman, 2005). For instance, in case two the entrepreneurial teachers invited EDB and expertise from the university to enhance teachers' competency in the new curriculum. All entrepreneurial teachers also became facilitators in guiding and teaching teachers to adopt the new curriculum. These were the processes of learning through doing.

The close monitoring and learning process encourages teachers to step out their comfort zones. Learning through doing with entrepreneurial teachers unleashed teachers' own potential to develop their innovative pedagogy (Peltonen, 2008; Serinkan, 2013). Teachers found that they were able to handle the new curriculum on their own. Therefore, they dared to try a new pedagogy. In case one, subject teachers continuously designed new content and materials with entrepreneurial teachers. In case two, the Subject Coordinator took the initiative to launch a curriculum reform in their subject. Case three teachers even sought entrepreneurial teachers' assistance in developing a new project and applying for the Quality Education Fund.

I refined the description of 'promote organizational learning' into 'learning breakthrough' because the learning process was not for the whole school. Therefore, the word

organization was deleted. Moreover, the learning process takes place in the implementation stage with the entrepreneurial teacher's support. Teachers, who learn in this process, may be willing to step out from their comfort zone and generate or employ other innovative pedagogies in the future. This is a breakthrough for teachers to try new pedagogy. 'Learning breakthrough' presents how teachers have a breakthrough in teaching through the process of learning through doing.

7.2.1.4 Sustainable innovation as a team

TEB contributed to the sustainability of innovation in the school curriculum by accelerating the interaction among the teaching communities. As Giles and Hargreaves (2006) stated, innovation might fade after a 'quick success' and became embroiled in strife. The sustainability of innovation is a challenge for most of the schools. However, this study showed that all schools were continuously revising their curriculum and generating more innovative ideas following the success of their school-based curriculum.

Previous works of literature emphasized the effectiveness of promoting learning communities for innovation sustainability. From their point of view, the learning community was the foundation for carrying out the innovation (Argyris et al., 1978; Law et al., 2011), which enhances teachers' capacity to generate ideas and employ new pedagogical strategies. Schools who failed to facilitate the teacher learning community have often failed in innovation sustainability (Lieberman et al., 2008). Law et al. (2011) studied 65 of 83 cases about how the professional learning community encouraged teachers to be more innovative. They found that the innovation sustainability of these schools was high where the professional learning community was encouraged. Within the learning community, teachers learned new competencies and ideas through observation and interaction (Wiens et al., 2013). The teacher learning community fostered the professional development of teachers and served as a valuable vehicle to enhance the sustainability of innovation that lasts over time through teamwork and dispersed leadership (Senge, 2000; Suh et al., 2017).

To a certain extent, this study agrees with the advocacy of a teacher learning community.

Entrepreneurial teachers formed a similar learning community with the principal, such as regular meetings and lesson observations. Entrepreneurial teachers decided the direction for the curriculum reform, sought expert assistance and joined the professional community. They did not only imitate other successful practice in their school. Based on the advice from experts, all subject teachers contributed to deciding the structure of the teaching and learning strategies by considering their school's direction and their students' needs. Furthermore, the principals and entrepreneurial teachers understood the importance of teacher professional development in generating innovative ideas for teaching and learning. The process of developing the new curriculum also goes hand-in-hand with teacher professional development. Teacher professional development served as an impetus, encouraging and equipping teachers to change, while contextualizing changes in strategic sourcing. Teachers could generate innovative ideas by learning from others. Entrepreneurial teachers then formulated a systematic review and operation system to develop teachers in adapting the new curriculum, which in turn cultivated a positive environment to promote innovation sustainability at school (Law et al., 2011).

Although the teachers' learning community seems to be a significant factor in innovation sustainability, entrepreneurial teachers were the core factor of promoting it in school. In reality, the teacher learning community might introduce the problem of standardization, which threatens innovation sustainability (Giles et al., 2006). Some schools might have a well-constructed and standardized system for the teacher learning community, but they just offset the threat of decline in the school life cycle and the regressive effects of standardized reform strategies. Innovative schools with high sustainability have not relied solely on the standardized learning community, but have also continuously refined and extended their own community to form an innovative pedagogical change (Tytler, 2009). Innovation sustainability needs to be thought of in a more complex way than merely as the formal structures and practices of the teacher learning community. Teachers' capacity is the critical element in creating a more resilient teacher learning community which can maintain innovation sustainability (Giles et al., 2006; Tytler, 2009).

This study indicates that TEB might be the teachers' capacity that Giles et al. and Tytler

looked for. Entrepreneurial teachers performed autonomy-enthusiasm in developing an innovative teaching and learning pedagogy. They were the facilitators in the learning community. In general, their schools had already formed a structural learning community for teachers. They shared information and conducted regular lesson observations. Entrepreneurial teachers used the rigorous school review system and the learning community to promote the innovation sustainability of the school-based curriculum. As sensible and well-organized leaders, entrepreneurial teachers reviewed the effectiveness of the school-based curriculum, such as teachers' feedback and students' performance, through the standardized review system. Building on the collected information, they tried to explore and generate ideas for continuously improving the school-based curriculum with teachers. More innovative ideas were developed by entrepreneurial teachers and their team members in the community.

The entrepreneurial teacher also plays the role of an innovation facilitator. Through the rigorous review system, teachers witnessed the positive impact of a new teaching approach, which motivated them to make changes in practice and sustain those changes (Guskey, 2002). Entrepreneurial teachers encouraged teachers to propose new ideas on teaching and learning from the bottom up. They became the facilitator who stimulated teachers' thinking by sharing their experience and providing administrative support. In addition, they found internal and external resources to actualize teachers' ideas. The entrepreneurial teachers automatically created the conditions for teachers to learn from others and generated innovative ideas, while the principals formalized the learning community as the school system.

In this study, teachers adapted new teaching pedagogy and continuously generated new ideas for teaching and learning with the support of entrepreneurial teachers to the teachers' learning community. They tend to play the role of facilitator in the community. In general, the principals formed the standardized teacher learning community and rigorous review system. Entrepreneurial teachers tried to maximize the function of these communities to mobilize teachers in developing the school-based curriculum. As teachers stated, teachers were more willing to become active in proposing innovative pedagogies. The impact of

TEB was not a ‘fast fix’, it also enhanced the innovation sustainability at schools.



Table 7.10 Re-conceptualize the impact of TEB on teachers

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
General performance - Enhanced teachers' teaching performance	Entrepreneurial teachers are: - Using or constructing a rigorous system to monitor the process of implementing the curriculum.	Enhancing teachers' performance (Direct impact) - <i>Working efficiency</i> : Working efficiency is the coordination competency used in employing or developing the rigorous monitoring system.	Provide concrete explanation of how TEB influences teachers' performance in the school context. Explore and clarify the role of entrepreneurial teachers as accelerators of learning in the organization.
Not found in literature	- Taking the initiative to facilitate teachers in developing the school-based curriculum. - Convincing teachers to trust them with reliable coordination competency. - Gaining trust of teachers with the attribute of humility-confidence.	- <i>Trusting relationship encourages teachers' coherence (New)</i> : Teachers are willing to work seriously with others and ultimately have a positive impact on team performance by fostering trust.	
Promote organizational learning - Form a learning community among teachers Risk-taking with higher job satisfaction - Create job satisfaction for teachers and motivate teachers to take risks	- Facilitating teachers to learning through doing - Providing support for teacher inquiry and reflection - Unleashing teachers' potential in developing their innovative pedagogy in teaching - Playing a facilitating role in teachers' community	- <i>Learning breakthrough</i> : The learning process was not for the whole school. Teachers, who learn through this process, may be willing to step out their comfort zones and generate or employ other innovative pedagogies in the future. - <i>Sustainable innovation as a team</i> : TEB contributed to the innovation sustainability of the school curriculum, especially accelerating the interaction between teachers' communities.	
Expanding network for resources (Unique in education) - Gain external resources for school's operation	Entrepreneurial teachers: - Gain internal and external resources for developing the school-based curriculum	Shift to TEB	Clarify the purpose of using resources



7.2.2 Indirect impact – Students’ learning and growth

The impact of TEB on students’ learning and growth is difficult to substantiate, because of the diversity in measuring such growth. In general, entrepreneurial teachers performed TEB to work with teachers and coordinate every resource in the construction of the school-based or subject-based curriculum for students. Although they constructed a positive learning environment for students, there were many other factors affecting students’ performance. I could not simply assign the improvement in students’ achievement to the merits of TEB. Therefore, I analyzed the impact of teachers’ entrepreneurial behavior on students by reviewing the perceptions of the interviewees and supporting documents. Synthesizing the findings suggests that there are two significant impacts, engagement in learning and learning performance. Table 7.11 illustrates the process of re-conceptualizing the impact on students’ learning and growth, while section 7.2.2.1 and 7.2.2.2 explains that in detail.

7.2.2.1 *New items - Engagement in learning*

Engagement in learning, which was not found in the previous empirical studies, is an unanticipated finding in the impact of TEB on students. The engagement in learning is a subjective perception from the teachers and parents. In general, they think that the entrepreneurial teachers’ innovative curriculum caters to students’ learning difficulties and smoothly integrates new pedagogy into the school context. The tailor-made curriculum motivates students to engage in learning activities.

For example, case one students actively participated in the mathematics activities. Case two students engaged in learning through the whole-school-based curriculum. They showed increased academic motivation (Scales et al., 2000) because they applied their knowledge across subjects. Case three students regularly reviewed the teaching materials at home. Teachers perceived that students showed great interest in learning via the new curriculum. The tailor-made curriculum mobilized students to be more attentive both in and after lessons. Most importantly, the students’ engagement became the foundation for better learning performance at school (Marchand, 2014).



7.2.2.2 *Learning performance*

According to teachers' observations, they perceived that TEB creates conditions which enhance students' learning performance from both academic and self-management aspects. They believed that these are the expected impacts because enhancing academic performance and students' self-management skills were the purpose behind developing the school-based or subject-based curriculum. Entrepreneurial teachers just fulfilled their purpose.

With regard to academic performance, the framework for analysis already stated that TEB enhanced teachers' teaching performance and facilitated students learning at school (Hietanen, 2015; Chand et al., 2006). In this study, the findings enrich the understanding of how entrepreneurial teachers enhanced students' academic performance. They performed their entrepreneurial behavior to lead teachers in delivering the school-based curriculum. In the curriculum, teachers changed the instructional practices of teaching and learning, which had a positive effect on students' academic achievement (McCaffrey et al., 2001), especially in reading and writing (Espin et al., 2005). Since the adoption of the new curriculum, all schools' TSA pass rates increased. Teachers discerned that academic improvement is the result of promoting the entrepreneurial teachers' curriculum.

Enhancing students' self-management skills is an unexpected impact of TEB. In the framework for analysis, there was no specification of the meaning of students' learning performance. However, this study's findings revealed that entrepreneurial teachers do not only focus on academic performance. They consider the students' self-management skills as well. Two cases integrated the self-management skills into their curriculum, which facilitated students to develop them (Richards et al., 2013; Buckner et al., 2018). In case two, the whole-school-based curriculum emphasized the integration of subject knowledge. Students needed to take care of their daily life and help their society, which nurtured their self-management skills in living and serving the community. In case three, they emphasized the self-management skills of taking care of their own daily living needs. Teachers and parents recognized the improvement in students' self-management skills.

I decided to employ ‘learning performance’ as the term for describing the impact of entrepreneurial behavior instead of students’ ‘general performance’. Although various entrepreneurial teachers performed similar behaviors in developing the curriculum, the impact on students’ performance is diverse. The impact of TEB on students is dependent upon the purpose of the school-based curriculum. The common feature of these impacts is the learning process. Students acquired knowledge or skills in the school-based curriculum, depending on the conditions that were created by the entrepreneurial teachers. Therefore, I adopted ‘learning’ as the keyword when describing students’ performance.

Table 7.11 Re-conceptualize the impact of TEB on students

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
General performance - Facilitated students’ learning at school	Entrepreneurial teachers constructed conditions in which: - Teachers observed that students showed great interest in learning through the new curriculum.	Students’ learning and growth (Indirect impact) - <i>Engagement in learning (New):</i> Students have high engagement in the school-based curriculum.	Provide concrete explanation of how TEB influences students’ learning and growth in the school context.
	- Students acquired knowledge or skills in the school-based curriculum. The conditions are created by the entrepreneurial teachers.	- <i>Learning performance:</i> The impact of TEB on students is dependent upon the purpose of the school-based curriculum. The common feature of these impacts is the learning process of acquiring knowledge and skills.	

7.2.3 Indirect impact – School branding

School branding is an indirect impact of TEB. Table 7.12 indicates the process of re-conceptualizing the meaning of creating competitive advantage and turning it into school branding. Originally, the framework for analysis indicated that entrepreneurial teachers created a unique curriculum and had a significant influence in dealing with the competitive environment of organizations (Frey, 2010; Yang, 2008; Swiercz and Lydon, 2002). To a

certain extent, the findings of the three cases echo the framework for analysis. Entrepreneurial teachers recognized the problem of traditional teaching strategies at school. In order to solve the problem, they developed a school-based curriculum with innovative pedagogical strategies, such as mass media education, reading for writing, and social-living videos, etc. Entrepreneurial teachers' curricula addressed the students' needs, which became a comparative advantage in the education section.

However, there are slight differences between the framework for analysis and the findings. In the literature review, the comparative advantage would lead to the pursuit of a new venture (Benyamin, 2008). In this study, I did not discover new ventures for the school, other than teachers' initiatives in new projects and curricula. Instead, the comparative advantage to the school is in promoting school branding and securing the student intake to the school. Branding refers to the product or service that the customer perceives as relevant and uniquely applicable to their needs (De Chernatony et al., 1992). Branding also has a distinguishing concept of the service for the customer, which was inherent in the service as characteristics (Gilmore, 2003; De Chernatony et al., 2003). In this study, the comparative advantage of the entrepreneurial teachers' curricula is to enhance the school branding for attracting potential parents. In case one, the primary school was located in a competitive district. They strove for the intake of more academic students to improve the school's ranking. In case three, the school used to struggle with the problem of sustainability. The competitive advantage was to draw the parents of special needs students to apply for this school. They overcame the difficulties of lower student intakes. These findings were the unexpected and indirect impacts of the entrepreneurial teachers' curricula.

Compared with 'creating a competitive advantage', I prefer to employ 'school branding' when interpreting the impact of TEB on schools. Although the primary purpose of performing the entrepreneurial behavior is enhancing students' learning, they unintentionally create a comparative advantage. The entrepreneurial teachers do not only create the comparative advantage, but they also enhance the school branding which draws the attention of targeted parents.

Table 7.12 Re-conceptualize the meaning of creating competitive advantage

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Creating competitive advantage - Created a unique curriculum and had a significant influence in dealing with the competitive environment of organizations	Entrepreneurial teachers' curriculum is: - Promoting school image - Attracting potential parents - Not creating a new venture for the education sector	School branding (Indirect impact) - Entrepreneurial teachers enhance school branding to draw the attention of targeted parents	Minimizing the exaggeration of the impact of TEB in the sector.

7.2.4 A summary of the response to research question two

In response to the variety of meanings of impacts in the business and education sectors, this study addressed the problem of diverse contexts between the two sectors. The understanding of the impact of TEB was limited and vague before. This study stays focused on the school context and conducts an in-depth investigation into how entrepreneurial teachers influence teachers, students, and schools with explicit evidence and explanation.

Most importantly, the re-conceptualized process of the findings reveals that teachers who work closely with entrepreneurial teachers, are significantly influenced in the process of developing the curriculum. Conversely, students are affected by the conditions which are created by the entrepreneurial teachers. The description of the impact of TEB becomes more accurate.

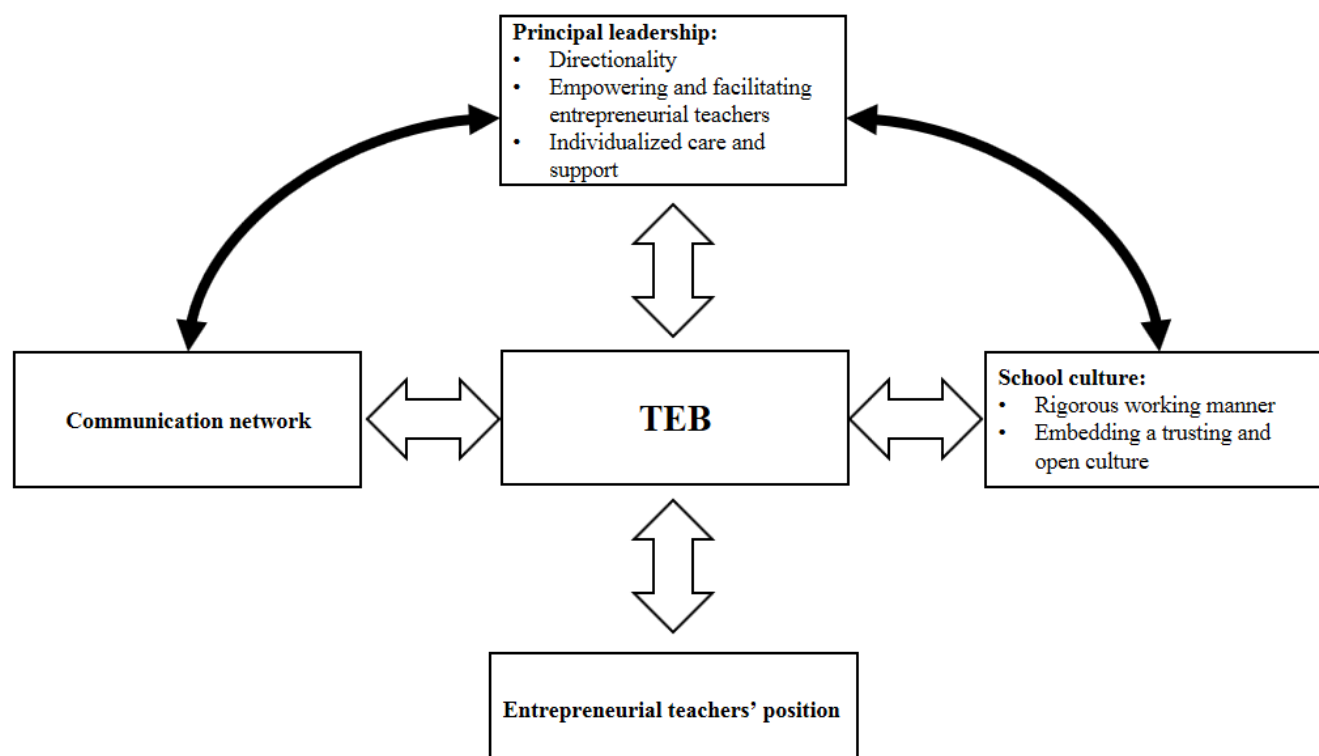
Because of the new findings on the impact of TEB, I further reviewed the literature on the sustainability of innovation, trust for coherence, and the positive level of influence. I found that entrepreneurial teachers play a paramount role in leading a team and motivating colleagues to step-out of their comfort zones through collaboration and learning. This discussion may contribute to the direction of future studies.

7.3 Response to Research Question Three

What school conditions enhance or challenge TEB?

This section aims at addressing the research niche of the conditions enhancing TEB in schools. I found that the conditions enhancing TEB are: principal leadership, organization culture, communication network, and entrepreneurial teacher position (see figure 7.4).

Figure 7.4 The conditions for enhancing TEB



In this study, the findings of TEB in chapter 4 to 6 indicated that entrepreneurial teachers already have an excellent performance in their innovative teaching without conditions' support before developing the innovative curriculum. This echoes some updated study about TEB that entrepreneurial teachers may thrive in most conditions in their career (Ciftci, 2019; Juwita et al., 2019). Further, many studies (Bagheri et al., 2011; Jain et al., 2013; Man et al., 2008; Metcalfe, 2011; Nyello et al., 2015) provide evidence for connecting the interaction between conditions and entrepreneurial behavior. These studies indicate that a constructive condition is favorable for teachers and employees to maximize their entrepreneurial behavior. According to the findings, I found that entrepreneurial teacher fully utilizes the constructive schools' condition to enhance their impact of TEB, while the conditions also stimulate their TEB as well.

To further discuss the conditions, I presented the analysis of principal leadership first (7.3.1). Then, I explained how organizational culture (section 7.3.2), the communication network (section 7.3.3), and entrepreneurial teachers' position (section 7.3.4) facilitated TEB in developing the new curriculum. I also stated the limits of rewarding (section 7.3.5) in the education sector as a factor for fostering entrepreneurial behavior.

7.3.1 Principal leadership

Multiple principal leadership attributes were identified as enabling entrepreneurial teachers to develop a new curriculum. They are directionality, empowerment and facilitation, and individualized care and support. (See table 7.13)

7.3.1.1 Directionality

With reference to the framework for analysis; I have not found any study discussing how the principal's directionality influences teacher entrepreneurial behavior. However, this study shows that all principals have a clear direction for the school's development, which inspires the entrepreneurial teacher to determine the direction of the curriculum and aim for excellence in its implementation.

The principal's role in shaping the school's direction through vision, mission, and goals is a primary avenue of influence (Hallinger et al., 1998) on entrepreneurial teachers' behavior. For instance, in case two, the Principal employed a systematic reviewing system to locate the weakness of the school and from that determined the future direction of the school by identifying the major cause for concern as being the learning diversity among students. Although the entrepreneurial teacher had already recognised the problem of learning diversity in her lessons, the Principal's major concern inspired her and became the reference for her to decide the direction of her whole-school-based curriculum. The Principal's directionality worked as a guiding objective for the entrepreneurial teacher.

However, direction by itself was not enough to influence what most teachers actually did (Barnett et al., 2003). In general, direction needs to be grounded in some level of practicality otherwise followers may view it as unrealistic or wishful thinking (Berson et

al., 2001). This study realized that the direction of the entrepreneurial teachers' curriculum most likely connects to the principal's direction, such as the integration of moral education in case one and catering for autistic students in case three. I found that entrepreneurial teachers had the opportunity to participate in the formation of the principal's direction for the school. The three schools have a rigorous system to review school performance. Entrepreneurial teachers can voice their concerns to the principal. Therefore, the principal's direction integrates the entrepreneurial teachers' suggestion. This mobilizes entrepreneurial teachers to commit to their new curriculum because they feel a sense of ownership.

Furthermore, all principals ensured the alignment between the school direction and the curriculum direction. Principals recognized that entrepreneurial teachers connected the direction of their curriculum to the school's direction. They believed that entrepreneurial teachers could monitor the implementation of the curriculum and stick to the school's direction. Therefore, they limited their interventions to their subject knowledge and pedagogy unless it made a significant difference. Their leadership style unleashed entrepreneurial teachers' behavior in coordination competency, innovation, and autonomy-enthusiasm.

7.3.1.2 Empowering and facilitating entrepreneurial teachers

Principals empower entrepreneurial teachers to develop their curricula and provide facilitating measures to support them. These findings partly align with the framework for analysis. With regard to empowerment, empirical studies indicated that only the principal's tolerance level in making a mistake affected the TEB (Christensen, 2005; Rutherford et al., 2007; Hassan, 2012). The authority and responsibility of entrepreneurial teachers was not clarified. In this study, principals formally assigned the entrepreneurial teachers to be in-charge of developing the school-based or subject-based curriculum. The principal's duty was limited to monitoring the direction and reviewing the result. Principals had a high tolerance level for the entrepreneurial teacher to use 'trial and error', which promoted entrepreneurial teacher innovative behavior (Manimala et al., 2007; Pieterse et al., 2009). In all cases, entrepreneurial teachers were trying a new pedagogy. In case one the entrepreneurial teachers invited teachers to be the actors in the film, which could have had

a negative impact on the teachers' image. The Principal authorized the entrepreneurial teachers to take this risk. The case three whole-school support scheme might have had the drawback of resistance from teachers. The Principal empowered the entrepreneurial teachers to try the scheme in their own classes and share the results with teachers. By combining TEB with tolerance to making a mistake; the principals are empowering the entrepreneurial teachers to generate and actualize the innovative school-based curriculum. Entrepreneurial teachers have a chance to work as leaders to promote their innovative teaching and learning pedagogy.

In considering the facilitating measures, the findings align with the framework for analysis. The principal's support has a substantial effect on enhancing TEB (Mukherii et al., 2012). However, the principal's support includes a variety of behaviors, such as instructional freedom, resources, bending the rules, etc. (Hanson, 2017). This study clarifies that principals' support can be specified for teachers' professional development and administrative arrangements. All principals considered how teachers' professional development fulfilled the needs of implementing the entrepreneurial teachers' curriculum. They might invite experts into school to support teachers or send teachers to participate in a development program. With regard to administrative arrangements, principals do not make entrepreneurial teachers responsible for all arrangements. Instead, they rearrange the timetable in order that entrepreneurial teachers can meet with team members. Case one has a core team meeting session, while case two has a matrix subject operation system. These facilitating measures enrich entrepreneurial teachers' knowledge and allow them to coordinate the curriculum.

I combined empowerment and facilitating measures into one term – enhancement - because principals were empowering entrepreneurial teacher by providing facilitating measures. They are not the major factor in leading the curriculum, but they act as mediators to accomplish the entrepreneurial teachers' curriculum (Drent et al., 2008). Empowering and facilitating entrepreneurial teachers was a process of enhancing TEB in leading the curriculum.

7.3.1.3 Individualized care and support

The principals show individualized care and support to entrepreneurial teachers that nurture their growth in coordinating teachers, and even helps them to locate their own career path. As the framework for analysis stated, the close relationship between principals and entrepreneurial teachers has a positive impact on nurturing entrepreneurial behavior (Soriano et al., 2007). This study has the same findings with regard to the relationships between the principals and the entrepreneurial teachers.

In all cases, principals have a close mentoring relationship with entrepreneurial teachers. They understand the entrepreneurial teachers' character clearly. Because they appreciate the entrepreneurial teachers' work ethic and performance, principals offer the opportunity for them to be in-charge of the subject or to be the curriculum coordinator. They mentor the entrepreneurial teachers in handling administration and staff relationships. The findings indicate that principals, with the awareness of effecting entrepreneurial teachers, employed a proactive approach in supporting entrepreneurial teachers' professional growth and excellence (Brown et al., 2009), which enhanced the impact of TEB on the curriculum. The entrepreneurial teachers in cases two and three had no experience in leading a team. However, the principals have a close mentoring relationship through which they share their leadership experience with them. The entrepreneurial teachers found that this mentoring relationship promoted their coordination competency in developing the curriculum.

Furthermore, principals also encouraged entrepreneurial teachers to consider their careers (Wong, 2004). They promoted all entrepreneurial teachers at/after the implementation of the new curriculum. The principals further inspired entrepreneurial teachers to develop their careers in mathematics (Case one); curriculum planning (Case two); and therapy teaching (Case three). They nurtured entrepreneurial teachers' sense of responsibility in being the professional experts at their school. This is the evidence that principals strengthen entrepreneurial teachers' belief in their own careers.

7.3.1.4 Connecting to transformational leadership

The above leadership features have a strong connection with the business study's findings in transformational leadership. All entrepreneurial teachers agreed that there is a mentor-mentee relationship between themselves and the principal. The principals recognized the entrepreneurial teachers' potential in developing a new curriculum and nurtured them to be leaders at schools. The principals' inspiration and facilitation empowered entrepreneurial teachers to actualize their innovative school-based curriculum. The features of these principals' leadership are similar to the transformational leadership.

In general, transformational leadership focuses on how the principal exercises influence over teachers and on the nature of principal-teacher relations. It emphasizes communicating a compelling vision; conveying high-performance expectations; projecting self-confidence; modeling appropriate roles; expressing confidence in teachers' ability to achieve goals; and emphasizing collective purpose (Leithwood et al., 2011). According to the findings, there are three major characteristics from the cases' principal leadership. They are directionality, individualized care and support, and empowering and facilitating entrepreneurial teachers. These characteristics are similar to the attributes of being a transformational leader at the school.

I match the findings of principal leadership to transformational leadership in table 7.13. I found that they are complementary to one another. With regard to directionality, this characteristic of principal leadership is similar to the idealized influence and inspirational motivation of transformational leadership. A transformational principal creates and communicates the vision for the school community (Navickaitė, 2013) and serves as a role model for followers (Bass & Riggio, 2006; Kotter, 2012). Their vision is the strong predictor for others (Meyer and Goes, 1988). In all cases, the three principals understand the strengths and weakness of their school. They systematically collected school data and located the school's needs. Based on their analysis, they decided the vision and direction for entrepreneurial teachers to address the school's needs, especially catering to students' learning diversity. Meanwhile, entrepreneurial teachers also realized the needs of catering to students' diversity, from their point of view it was a problem to be solved. However, it

was the principal who stimulated their thinking that these problems were connected to the overall vision. They continuously communicated the vision to the entrepreneurial teachers and encouraged them to achieve it.

With regard to individualized care and support, the principals cared about and closely mentored the individual entrepreneurial teachers' personal growth. As transformational principals, they perform individualized consideration, included providing support, encouragement, and coaching to teachers (Kark and Shamir, 2002). These individualized considerations provided customized socio-emotional support to entrepreneurial teachers (Antonakis and House, 2002). The principals' transformational leadership was fully mediated by this emotional support, which enhanced entrepreneurial teachers' autonomous motivation (Berkovich & Eyal, 2017; 2018). In interviews, the entrepreneurial teachers talked about the difficulties of convincing resistant teachers to participate in the school-based curriculum. They stated that their principals encouraged them to overcome these barriers and shared the skills for managing these subordinates. This individual care and support mobilized and equipped entrepreneurial teachers to accomplish their innovative curriculum (Alpkan et al., 2010).

Furthermore, the characteristic of empowering and facilitating entrepreneurial teachers is a kind of intellectual stimulation. Intellectual stimulation involves increasing the awareness of problems, and challenges followers to view problems from new perspectives (Kark et al., 2002) and thus achieve excellent performance (Bass et al., 2012). It nurtures followers' growth by considering their needs for moral purpose (Smith, 2003). When considering stimulating creative and innovative thinking (Bass, 2006), Cronshaw (1999) suggested that leaders should have adaptive skills in managing and adjusting physical, interpersonal and organizational arrangements in implementation, while clearing away obstacles and providing adequate resources (Kotter, 2012). According to the findings, the principals created the physical and emotional environment in which the teachers could reflect upon their learning. They promoted entrepreneurial teachers to be in charge of the school-based curriculum. Although the principals minimized their intervention to the entrepreneurial teachers, they utilized physical meetings, such as core team member meetings, the Nam

Chong information board, and the matrix operation system. They also supported the entrepreneurial teachers in organizing teachers' professional development which connected to their school-based curriculum. Entrepreneurial teachers had many opportunities to reflect on the development of the school-based curriculum with the principals' support. As the entrepreneurial teachers stated, they had an opportunity to grasp the vision with their thinking.

Table 7.13 Matching cases' principal leadership to transformational leadership

Findings of principals' leadership	Transformational leadership	Features	Evidence
Directionality	Idealized influence and inspirational motivation (Bass et al., 2006; Kotter, 2012; Meyer et al., 1988; Navickaitė, 2013)	Visionary sharing and continuous communication	Section 4.4.1.2, 5.4.1.1, 5.4.1.2, and 6.4.1.2
Individualized care and support	Intellectual stimulation (Alpkan et al., 2010; Antonakis et al., 2002; Kark et al., 2002)	Mentor-mentee relationship	Section 5.4.1.3, 6.4.1.1, and 6.4.1.3
Empowering and facilitating	Individual consideration (Bass, 2006; Bass et al., 2012; Cronshaw, 1999; Kotter, 2012; Smith, 2003)	Delegate authority and responsibility to entrepreneurial teacher and Provide administrative support	Section 4.4.1.1, 4.4.1.3, 5.4.1.3, and 6.4.1.3

To sum up, principal leadership is a significant condition in enhancing TEB. Transformational principals provide a direction, facilitating measures, and individualized care for the entrepreneurial teacher. They facilitate TEB (Ling et al., 2008) at school in terms of innovation (Yang, 2008; Gumusluoğlu et al., 2009) and coordination competency with trust. These intangible measures enhance entrepreneurial teachers' competencies in leading and reinforce entrepreneurial teachers' professional growth, which motivates their persistence in implementing their curriculum.

Table 7.14 Re-conceptualize how principal leadership enhances TEB

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Principal's Leadership <ul style="list-style-type: none"> - School management and leadership is central to accelerating teachers' professional development by providing substantial support. - The effectiveness of leadership is also dependent upon the employees' characters. 	Principals are: <ul style="list-style-type: none"> - Providing clear direction for entrepreneurial teachers - Minimizing the intervention to entrepreneurial teachers leadership unless it makes a significant difference 	Principal leadership <ul style="list-style-type: none"> - <i>Directionality:</i> Principals inspire the entrepreneurial teachers to determine the curriculum direction and strive for excellence in implementation. 	Provide concrete explanation of how principal leadership facilitates TEB within the school context. Validate and clarify the influence of transformational leadership on TEB.
	<ul style="list-style-type: none"> - Empowering entrepreneurial teachers to be in-charge and are tolerant of their mistakes - Facilitating entrepreneurial teachers in terms of teachers' professional development and administrative arrangement. 	<ul style="list-style-type: none"> - <i>Empowering and facilitating entrepreneurial teachers:</i> Principals play mediator in accomplishing the entrepreneurial teachers' curriculum. 	
	<ul style="list-style-type: none"> - Having close relationships with entrepreneurial teachers - Providing emotional and career guidance to entrepreneurial teachers 	<ul style="list-style-type: none"> - <i>Individualized care and support:</i> Principals nurture entrepreneurial teacher growth in coordinating teachers, and by locating career paths. 	

7.3.2 School culture

The operational meaning of organizational culture represents the working practice; learning environment; encouragement of diversity; focus on innovation and capacity of employees; and feedback on innovation (Srivastava et al., 2010). This study finds that the principal has a direct influence on cultivating the above organizational culture, which promotes entrepreneurial teachers to perform entrepreneurial behavior at school (Szczepańska-Woszczyńska, 2015; Baggen et al., 2016). With regard to the findings from the three cases, I analyzed how organizational culture enhances entrepreneurial behavior in developing the curriculum and present my findings in table 7.15.

7.3.2.1 Rigorous working manner

A rigorous working manner facilitates entrepreneurial teachers to execute their school-based curriculum efficiently. Past works of literature have not discussed how other teachers' working attitudes influenced TEB. However, this study found that all principals are systematic and rigorous leaders. They created distinctive rigorous working environments within the school which profoundly encouraged teachers to commit to work (Anderman, 1991).

For instance, in all three cases the teachers are required to follow the systematic process of curriculum implementation. They reviewed school and subject reports, planned for improvement in the new academic year, implemented the plan, and conducted a review of the focus and quality of their process. The schools' rigorous operating procedures influenced teachers' sense of individual and collective job satisfaction and commitment (Manimala et al., 2007). They formed rigorous working habits in handling all tasks.

When entrepreneurial teachers promoted a school-based or subject-based curriculum reform, the rigorous working manner of all teachers enhanced the performance of the new curriculum. Entrepreneurial teachers first formed a team with the rigorous monitoring system as stated in the coordination competency. They found that teachers, who were used to working in a rigorous working manner, performed their duties efficiently and effectively. This condition facilitated TEB in leading and risk-taking. The reliable performance of colleagues encouraged the entrepreneurial teacher to lead and take risks in trying new pedagogy with teachers because their rigorous working manner would spot weaknesses and improve the quality of the curriculum. Therefore, entrepreneurial teachers emphasized the contribution of their colleagues in developing the curriculum.

7.3.2.2 Embedding a trusting and open culture

Entrepreneurial teachers gain innovative ideas from teachers in a trusting and open culture. The findings support the framework for analysis that a positive learning culture is a crucial factor to facilitate TEB (Kurniawan et al., 2017; Dam et al., 2010). However, literature

seldom stated the features of a positive learning culture and how it facilitates TEB in leading the curriculum.

This study provides concrete features of a positive learning culture where a trusting and open culture is the key to promoting entrepreneurial teachers' innovation. The rigorous working manner promotes highly reliable teacher performance. Teachers believe in and cultivate good teamwork with colleagues. They are more open to incorporating other teachers' new ideas and are more willing to share new instructional strategies with others, because of the trusting and rigorous working manner (Evers et al., 2002; Lee et al., 2013). This collaborative relationship among teachers indicates that openness and trust comprise a positive learning culture at school (Hargreaves et al., 1990; Hargreaves, 1995). In general, once entrepreneurial teachers decide to promote the new school-based curriculum, teachers also voice their constructive advice to them. They generously share their ideas with each other. Entrepreneurial teachers take advantage of this willingness to share by gathering ideas from other teachers and modifying the innovative curriculum through the positive learning culture. For instance, in case one the entrepreneurial teacher generated every film idea with team members. In case two the entrepreneurial teacher integrated other subject learning strategies into her curriculum. She also contributed her ideas to leading other subjects. The entrepreneurial teachers in case three generated innovative ideas together and modified them with partners. The trusting and open culture was the foundation for enhancing the entrepreneurial teachers' innovative behavior.

To sum up, this study found that entrepreneurial teachers benefit from a rigorous, trusting and open culture. The rigorous working manner promotes trusting relationships among teachers. They perform reliably with open-minded teamwork, which enables entrepreneurial teachers to coordinate the new curriculum, take risks in trying new pedagogy, and generate innovative ideas for the new curriculum.

Table 7.15 Re-conceptualize how school culture enhances TEB

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Flexible and open school culture - Cultivating a positive organizational culture is essential for enhancing TEB.	Schools have: - Created distinctive rigorous working environments within the school that greatly encourage teachers to commit to work.	School culture - <i>Rigorous working manner:</i> Entrepreneurial teachers found that teachers work efficiently and effectively in developing the school-based curriculum.	Clarify the meaning of positive organizational culture for enhancing TEB.
	- Open culture among teachers which encourages sharing of resources and ideas. - Trusting and positive collaborative relationship among teachers.	- <i>Embedding a trusting and open culture:</i> Entrepreneurial teachers gain ideas from teachers through this constructive culture and modify their innovative curriculum accordingly.	

7.3.3 Communication network

The communication network is a channel for entrepreneurial teachers to coordinate the development of the new curriculum and generate innovations in curriculum modification, which maximizes the impact of entrepreneurial behavior in working with teachers. The findings of this study are strongly connected with the framework for analysis as shown in table 7.16.

The communication network can simply be divided into the external and internal network at school (Ignatius et al., 2008; Donaldson, 2001). With regard to the internal network, all cases have a rigorous communication network at school. Although bureaucratic communication procedures can be a major block to innovation (Manimala, 2007), this study found that encouraging professional communication among teachers supports the changes in teaching practice, even after the effects of enhanced knowledge and skills are taken into account (Garet et al., 2001). All entrepreneurial teachers serve in a school with

a special internal communication system, such as case one's subject core team, case two's matrix operation system, and case three's Nam Chong information board. These internal communication networks enable teachers to report and express their difficulties and concerns about the entrepreneurial teachers' curriculum. Entrepreneurial teachers take this opportunity to coordinate teachers to modify and implement the curriculum.

The communication network also facilitates social interaction between entrepreneurial teachers and teachers which furthers teachers' knowledge inside the curriculum (Lave et al., 1998; Yamada, 2004). Case one and two have an external communication network with experts and other schools. Entrepreneurial teachers and teachers generated innovative ideas from the outside. Furthermore, all case schools developed a sharing practice through sharing or reporting sessions. The sharing practice extended innovation practice among subjects in cases two and three. This study also found that entrepreneurial teachers perform a coordination competency to facilitate teachers' interaction through these communication networks. Their outstanding performance and facilitation impresses and inspires others to step out of their comfort zones and integrate ideas into their teaching. These findings are similar to Eyal's study (2008) that well-connected schools tend to employ an opportunistic entrepreneurial strategy. This study furthers his understanding that a well-connected school may extend the innovation among subjects and establish the foundation for forming innovative school-based or subject-based curriculum.

One special finding is that case three's entrepreneurial teachers serve in a small school, which also employed an informal communication network to handle the school's business. Entrepreneurial teachers also took the initiative to use this channel to work with resistant teachers. Their behavior is similar to the framework for analysis in that entrepreneurial teachers expanded their network through informal communications with the outsider (Koene, 2006).

Whatever form of communication network the entrepreneurial teachers employ, it serves as a channel for them to coordinate and modify the new curriculum with teachers. This study also provided essential findings that a regular internal communication system is a

core element in facilitating TEB.

Table 7.16 Re-conceptualize how communication networks enhance TEB

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Communication network <ul style="list-style-type: none"> - Constructing a communication network inside school promotes TEB. - Expanding a network inside the industry may generate more innovative ideas. 	Communication network can be: <ul style="list-style-type: none"> - Formal communication inside school - Informal communication among teachers - Entrepreneurial teachers' personal networks with outsiders 	Communication network <ul style="list-style-type: none"> - Is a channel for entrepreneurial teachers to coordinate the development of the new curriculum and generate innovation for curriculum modification, which maximizes the impact of entrepreneurial behavior in working with teachers. 	Provide concrete explanation of how entrepreneurial teachers employ communication networks to mobilize teachers to perform in school-based curriculum.

7.3.4 New item - Entrepreneurial teachers' position

The position of entrepreneurial teachers is an unexpected finding of the conditions enhancing entrepreneurial performance. This echoes the empirical studies that shaping the condition may contribute to enhance the impact of TEB. While all entrepreneurial teachers performed similar entrepreneurial behavior in developing the school-based curriculum, the scale of their impact, and the number of the new curricula in different subjects, was diverse, as shown in table 7.17. In case one, TEB triggered team members to generate more innovative teaching strategies. The impact on teachers was mainly in mathematics subjects. However, case two and three entrepreneurial teachers prompted other subjects to initiate the curriculum reforms as well. Although the condition of cross-subject communication was one of the reasons for increasing innovation among subjects, I also realized that entrepreneurial teachers' position of power could be the primary reason for the different scale of impact on teachers.

Hersey et al. (2013) stated that a position of power provides leverage to access information and influence colleagues within an interacting influence system. In general, a position of power stands for the authority to direct and control people in terms of resource allocation and scope of responsibility, which promotes cooperation and productivity (McCalley,

2002). With regard to personal power, Hersey et al. (2013) merely defined it as the cohesiveness, commitment, and rapport between leaders and followers. However, they did not specify the reason for the cohesiveness, commitment, and rapport among colleagues.

Hersey et al. (2013) and works of literature (Farris-Berg et al., 2012; Ouchi, 2009) assumed that once the teacher has the position of power in decision-making, they would have the autonomy to influence whole school success. The Ouchi (2009) study showed that teachers who were granted the authority to determine the budget, decision-making regarding learning program and materials, schedule, and staffing, were able to be more innovative with their teaching and learning. They stated that a position of power is the driver for increasing innovation within the school. However, Chen et al. (1995) found that teachers, who aggressively seek a position of power, indicated less job satisfaction, less teacher-administrator cooperation, a lower sense of job affiliation and more instructional difficulties on the job than did other teachers. The Chen study indicated that a position of power could offer leverage when enhancing the impact of increased innovation, but it also relied heavily on teachers' personal power. Unfortunately, there is no concrete explanation of how teachers cultivate personal power.

This study on the impact of TEB provides an alternative explanation of the way in which cultivating personal power interacted with a position of power. According to chapters five and six, the entrepreneurial teachers in cases two and three did not hold positions of power at the beginning, but they still performed TEB, such as risk-taking, autonomy-enthusiasm, and innovation as subject teachers. Although they performed the coordination competency and humility-confidence to try a new teaching and learning pedagogy with some teachers, the influence of their innovative teaching was restricted to one subject and could not be extended to all subject teachers. Fortunately, their outstanding performance was recognized by their principals who promoted them to specific positions of power, such as subject coordinator, the curriculum coordinator, and teacher development coordinator. As chapter seven stated, TEB enhanced teachers' coherent and working efficiency which facilitated entrepreneurial teachers to extend their innovative ideas to all subjects. Through the powerful position of being teacher-in-charge, they had the authority to form a rigorous

review system and promote teachers' interaction. This is a vivid example of explaining how TEB cultivated their personal power and the interactive relationship between positions of power and personal power.

Furthermore, this study also clarifies how a position of power influences the impact of TEB. Li (2015) studied the decision making of early childhood teachers. He found that leading teachers did not tend to take decisions or any individual initiatives, because there was no system of rewards, such as promotion (position of power) or discretionary payments. However, our findings showed that a position of power was not the driver for entrepreneurial teachers to perform the entrepreneurial behavior. There was no reward for their innovative teaching and learning pedagogy. However, being in a position of power affected the scale of their innovation. In case one the entrepreneurial teacher's position of power was restricted to the mathematics department. She only cultivated personal power within her own department. The leveraging influence of the position of power was small. In cases two and three the entrepreneurial teachers had the opportunity to work with all subject coordinators as a whole school approach. Their influence expanded to all subjects because of their positions of power. As a result, all subjects conducted a curriculum reform. This study shows that the proper use of positions of power leads to the enhancement of the impact of TEB in developing the school-based curriculum.

Table 7.17 Re-conceptualize how entrepreneurial teachers' positions restrict TEB

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Not found in literature	Entrepreneurial teacher's position: <ul style="list-style-type: none"> - May be restricted by entrepreneurial teacher's position of power before their promotion. - Case one entrepreneurial teacher only influences her subject department. - Case two and case three entrepreneurial teachers affect all subject curricula. 	Entrepreneurial teacher's position: <ul style="list-style-type: none"> - The proper use of a position of power leads to the enhancement of the impact of TEB in developing the school-based curriculum. 	Understand how entrepreneurial teachers' positions affect the scale of teacher professional development and the impact of TEB.

7.3.4.1 Possibility of constructing TEB profile

As the methodology part stated, this study employed multiple-site case studies to explore the meaning of TEB. I identified some differences among cases in analyzing the position of entrepreneurial teachers. The organizational positions of entrepreneurial teachers and school cultures significantly influenced the role of TEB. In this study, I uncovered three roles of these entrepreneurial teachers. They are the team leader, leader of curriculum, and facilitator. In this section, I tried to analyze their role in leading innovation.

In case one, the entrepreneurial teacher performed TEB as a team. As a subject coordinator, the primary duty of the entrepreneurial teacher is to ensure the teaching and learning, instruction. She worked closely with colleagues and formed various operational system to improve the administration and teaching performance. She also contributed to the colleague's capacity building, organization. However, no data indicated her contribution to the school policy and external context, system. I suspect that it related to the school culture. Although the Principal allowed teachers to voice their concern, they hadn't formed any cross-subject or cross-team system for teachers. The sharing culture was not common at school. Therefore, the entrepreneurial teacher might only play the role of being a change agent in the mathematics department.

In case two, the entrepreneurial teacher performed TEB as a leader. Being a curriculum coordinator is an advantage for the entrepreneurial teacher to perform multiple leadership roles. She is a subject teacher in Chinese and General Studies that had an opportunity to have a closer look at the implementation of a new curriculum. Her contribution to teaching and learning mainly went for identifying the problems and generating idea with subject teachers. Therefore, the first curriculum reform was successes in Chinese and General studies. One pivotal point is that she, as a Curriculum Coordinator, had not taken over the subject coordinator's authority. This reveals her humility in leading changes and respecting the subject coordinator's authority. Compare with teaching; she mainly engaged in policy and external context and colleagues' capacity building. According to chapter five, she constructed a new communication network to facilitate the implementation of the curriculum. She even proposed cross-subject sharing to promote community learning. As

she stated in the interview, the position of curriculum coordinator grants her the authority to form various strategies to assist colleagues, while she had the enthusiasm in promoting these strategies. To sum up, she played the role of innovation champion at the beginning of curriculum reform in her subject. After she developed a successful curriculum coordinator, she played the role of the linking agent at school, who mainly promoted two-way communication among subject teachers and bridging the gap of teaching with the school.

In case three, entrepreneurial teachers performed TEB as a facilitator. Although the Vice-Principal and subject coordinator were innovative in teaching and learning for their students, they seldom intervened in colleagues teaching strategies. They aimed at providing a teaching package for teachers to use the materials. They even seldom engaged in colleagues learning. Obviously, they were not active in playing the leadership role in the teaching and colleagues' capacity building. Conversely, the Vice-Principal and subject coordinator mainly contributed to the policy and external context. They aimed at being the facilitator to help teachers to master the new pedagogy and generate a new idea. They preferred to provide consultation and seek resources for teachers who had the intention to change. Obviously, this was the problem-solving facilitating practice that they assisted teachers to generate an innovative solution and actualize it. I suspect the possible reason for forming this facilitating system is related to the school's condition. In the special need school, every colleague is an expert in a specific area. It is difficult for them to collaborate with others to solve specific problems because colleagues do not familiar with colleagues' expertise. No collaboration between teachers was common in this case. With the support of findings, I found that lack of collaboration may be the reason why entrepreneurial teachers decided to play the role of being facilitator. They didn't intend to intervene in colleagues' professional judgment in teaching because they could not justify the effectiveness of colleagues' teaching strategies. Conversely, in the process of promoting innovative teaching, they concerned how to maintain the harmonious working relationship and respect colleagues' profession. Therefore, they aimed at facilitating colleagues to try the new curriculum and generated/actualized the innovative idea instead of monitoring or leading teachers to change. Furthermore, the success of entrepreneurial teachers also offered an opportunity for them to become a facilitator. First, findings indicate that teachers



who mastered the new pedagogy wonder to innovate a new teaching pedagogy. They had the incentive to seek entrepreneurial teacher's assistance. Second, the Principal granted the entrepreneurial teachers to provide consultancy support for colleagues as a formalized curriculum development process because he believes in entrepreneurial teachers' capability in generating and actualizing innovative idea. These conditions were a solid foundation for entrepreneurial teachers to become an innovation facilitator at school. Compare with the former cases; they might not be the change agent or linking agent. They were the facilitator and participator of generating and actualizing innovative idea at school.

This preliminary analysis shows the various role of being entrepreneurial teachers at school. It also indicates the possibility of studying the TEB profile in different schools by concerning the schools' condition and entrepreneurial teacher position. For ensure the trustworthiness of constructing variety TEB profile, more sample cases and in-depth investigation is needed.

7.3.5. Limitation of rewards in the education sector

The effectiveness of rewards is doubtful in enhancing TEB. In the business studies, rewarding has a positive relationship with entrepreneurial behavior (Rutherford et al., 2007; Eesley, 2006) until reaching the minimum threshold (Brazeal, 1996; Lloyd, 2005). This study found that the reward of promotion, motivated the Subject Coordinator in case three to perform his entrepreneurial behavior. However, other entrepreneurial teachers emphasized that they did not aim at promotion. This is an interesting finding in the education sector. I assume that rewarding is not a condition of facilitating TEB because of the teachers' remuneration system in Hong Kong. All entrepreneurial teachers are permanent teachers at their school. Unless entrepreneurial teachers make a critical mistake, such as sexual harassment, they enjoy high job security and remuneration. Teachers had already reached the diminishing point of monetary reward being a motivation. The promotion only increases their monthly salary by around 15%, which echoes the framework for analysis that there may be flattened performance following such small rewards (Fullan, 2013). Promotion is not an attractive motivation for them to perform the entrepreneurial behavior. On the other

hand, in case three, the Subject Coordinator was a former occupational therapist. He stated that he had suffered from unstable job security in the industry for many years. He saw promotion as crucial for him to ensure his job security. He enjoys a stable working environment at school, which encourages him to try more innovative pedagogy in his lessons.

To a certain extent, as shown in table 7.18, the findings echo the framework for analysis that rewarding can motivate the employee to perform the entrepreneurial behavior. However, this condition may not apply to the high ranking teachers in Hong Kong. The remuneration for teachers already surpasses the effectiveness of rewarding.

Table 7.18 Re-conceptualize the limitation of rewarding

Framework for analysis	Findings	Re-conceptualize with literature	Contribution
Rewarding - Rewarding has a positive relationship with entrepreneurial behavior	Rewarding: - The effect of monetary reward is low. The remuneration for teachers already surpasses the effectiveness of rewarding. - Their reward is students' growth.	Rewarding: - Rewarding is beyond a minimum threshold. It may not apply to high ranking teachers in Hong Kong.	Verify the limitation of rewarding in mobilizing teacher entrepreneurial behavior.

7.3.6 A summary of the response to research question three

This study addresses the research niche of insufficient understanding of how conditions interact with TEB. The findings provide a more explicit understanding of how the principal's leadership enables entrepreneurial teachers to develop the new curriculum. The principal is a mentor for entrepreneurial teachers to be leaders at school, while the organization culture and communication network are the foundations for entrepreneurial teachers to work with teachers. Entrepreneurial teachers, then, fully utilize the rigorous culture and network to perform entrepreneurial behavior for developing and accomplishing their innovative curriculum.

The number of conditions of enhancing TEB are fewer than implied in the framework for

analysis. The concept of entrepreneurial behavior is too far advanced for the education sector. Compared with the business sector, there is no formal entrepreneurial behavior course and market orientation to enhance TEB. Teachers aim to solve the students' learning difficulties instead of fulfilling market needs.

The recognition of principal leadership indicates that there is room for me to study the influence of principal leadership on TEB. With regard to the position of the entrepreneurial teacher in the school hierarchy, a further study should be connected to the impact of entrepreneurial teachers from different positions in order to verify these findings.

7.4 The Contribution of the Study

This study renders support to the importance of TEB at school, especially in developing the school-based curriculum. It also confirms that teachers' entrepreneurial behavior has an interactive relationship with school conditions.

This study employed a multiple site case study to address all research niches of the research questions by comparing the findings of three cases. Tables 7.1 to 7.17 show how the findings address the research questions and refine the framework for analysis. With regard to research question one, I have an explicit understanding of how TEB is enacted in schools in terms of the entrepreneurial teachers' competency and attributes. With regard to research question two, this study also contextualizes the impact of TEB in school. While entrepreneurial teachers mainly influence other teachers' professional development by encouraging them to step out of their comfort zones, they also create conditions for the 'school-based curriculum' to facilitate students' growth and promote the schools' branding. Last but not least, this study contextualizes the interactive relationship between school conditions and TEB in the education sector. Although there is a high diversity of conditions among the three cases, I recognized principal leadership as a core condition for entrepreneurial teachers to lead the curriculum. It affects the organizational culture and communication network, which also enhances TEB, especially in mobilizing teachers and generating ideas.

Although this study was conducted in Hong Kong, its relevance and significance are far from being limited to the Asia-Pacific region. The implications of this research in the area of TEB are likely to lie beyond geographical, cultural, and knowledge disciplines from the business sector to the education sector. There are a number of potential contributions that this study makes, both intellectual and practical, which may prove useful in determining the course of teacher professional development for enhancing organizational competitiveness.

7.4.1 Contribution to intellectual issues

In theory related issues, there are three key areas where this study contributes. Table 7.19

illustrates the relationship between the intellectual contribution to former literature and to the present study. I explain the details one-by-one from section 7.4.1.1 to 7.4.1.3.

7.4.1.1 TEB

The results of this study contribute to the TEB literature on how entrepreneurial teachers perform humility-confidence and reflective thinking in developing the school-based curriculum. The nature of TEB as reviewed by the data of this study is close to the earlier empirical studies with regard to such behaviors as: the ability to plan and manage a project (Sayeed; 2003, Weber et al; 2013; Rekha et al; 2014; Rusu et al; 2014); risk-taking (Dess et al, 2005; Weber et al, 2013); innovation (Hayat et al; 2015; Oplatka, 2014; Eyal et al, 2003); autonomy with a positive attitude (Dess et al, 2005; Weber et al, 2013; Bosma et al, 2010); and seeking external resources (Jain et al, 2013; Rusu et al, 2014). The findings refine these entrepreneurial behaviors into three competencies and three attributes to fit within the school context.

However, previous studies mainly discussed the competency of the entrepreneurial teacher in working with colleagues. This study considers the attributes of entrepreneurial teachers, especially their humility-confidence. This study provides a new domain for studying TEB. The humility-confidence attribute serves as an important and new concept when describing how TEB accomplishes the implementation of a school-based curriculum with colleagues. It is a social component where entrepreneurial teachers transcend the physical and mental barriers imposed by colleagues.

Moreover, previous studies seldom mentioned the links between coordination competency and reflective thinking. This study indicates that the coordination competency is an accelerator for entrepreneurial teachers and their team members to reflect upon what they have done. This connection contributes to self-reflection as an aspect in the study of teachers' professional development.

7.4.1.2 Impact of TEB

This study contributes to the understanding of how TEB effects the way entrepreneurial

teachers promote teacher professional development as organizational learning. As the research niches stated, the diverse context between the business and education sectors led to a variety of meanings for the impact of entrepreneurial behavior. This study indicates that the major impact of TEB is to enhance teacher performance by promoting greater working efficiency, teachers' coherence, and learning breakthroughs. These findings provide a more concrete explanation of how entrepreneurial teachers play a crucial role in promoting organizational learning (Molina et al., 2009; Vishal et al., 2014). Entrepreneurial teachers are the accelerators of fostering a trusting relationship among teachers. Every teacher has an opportunity to learn from each other in the process of developing a school-based curriculum. As section 7.2.4.1 stated, TEB enhanced the flexibility and modifiability of the standardized school structure which meant that teachers were more willing to become active in proposing innovative pedagogies. This finding shows that the study of TEB can connect to the understanding of organizational learning, especially within the professional teacher learning community.

Furthermore, this study also clarifies that TEB is not contributing to whole school professional learning. The scale of teacher professional development relied on the position of entrepreneurial teachers, which might be a constraint on performing the entrepreneurial behavior.

7.4.1.3 Condition of enhancing TEB

The findings help to clarify the influence of principal leadership and school culture in enhancing TEB. With regard to principal leadership, empirical studies discussed only the general influence of principal leadership on entrepreneurial teachers (Christensen, 2005; Mukherji et al., 2012; Rutherford et al., 2007; Suzete et al., 2014; Todnem, 2005). The findings serve as the first indication that principals' transformational leadership has a positive influence on entrepreneurial teachers. It aligns with the business sector studies (Jung et al., 2003; Sung, 2010; Yukl, 2001) and Eyal study (2008) in that this study validates the importance of transformational leadership and clarifies how that leadership enhances entrepreneurial teachers' performance.

With reference to the school culture, previous studies advocated that hierarchical structures create culture barriers to equipping TEB (Petrekis, 2005; Ribeiro-Soriano et al., 2010). However, this study reveals that a rigorous school culture, which is based on the hierarchical structure, allows entrepreneurial teachers to develop the school-based curriculum and engage more teachers to actively participate in that curriculum. Because of the hierarchical structure, entrepreneurial teachers can enhance teachers' learning through formalizing teacher sharing sessions. These findings clarify how entrepreneurial teachers utilize the rigorous school culture with the hierarchical structure to engage other colleagues.

Table 7.19 Research niches and intellectual contribution

Area of intellectual contribution	Research niches	Former literature	Intellectual contribution
TEB	Insufficient understanding of the definition of TEB	<ul style="list-style-type: none"> - Ability to plan and manage a project (Sayeed; 2003, Weber et al; 2013; Rekha et al; 2014; Rusu et al; 2014) - Risk-taking (Dess et al, 2005; Weber et al, 2013) - Innovation (Hayat et al; 2015; Oplatka, 2014; Eyal et al, 2003) - Autonomy with positive attitude (Dess et al, 2005; Weber et al, 2013; Bosma et al, 2010) - Seeking external resources (Jain et al, 2013; Rusu et al, 2014) 	<ul style="list-style-type: none"> - Clarify, re-conceptualize and provide concrete explanation of entrepreneurial behavior to fit the school context - Provide a new domain of studying TEB, humility-confidence.
Impact of TEB	Variety of meanings of impacts of TEB under the business and education context	Entrepreneurial teachers promote organizational learning (Molina et al., 2009; Vishal et al., 2014)	<ul style="list-style-type: none"> - Clarify the role of entrepreneurial teachers as accelerators in promoting organizational learning and sustainable innovation. - Understand how entrepreneurial teacher's position affects the scale of teacher professional development
Condition of enhancing TEB	Lack of in-depth understanding of various conditions (e.g. leadership style)	Provide general influence of principal leadership on entrepreneurial teachers (Christensen, 2005; Mukherji et al., 2012; Rutherford et al., 2007; Eyal et al., 2011; Suzete et al., 2014; Todnem, 2005)	<ul style="list-style-type: none"> - Validate and clarify the influence of transformational leadership on TEB - Align with empirical business studies
	Needs of understanding the interactive relationship between schools' conditions and TEB	Hierarchical structure creates a cultural barrier to equipping TEB (Petrekis, 2005; Ribeiro-Soriano et al., 2010)	<ul style="list-style-type: none"> - Clarify how entrepreneurial teachers utilize the rigorous school culture with the hierarchical structure to engage other colleagues



7.4.2 Contribution to professional practice issues

In chapter one, I stated that this study identifies the attributes and impact of TEB in schools. Regarding the practice-related issue, the above findings promote the professional development of teachers and principals within the teaching profession.

7.4.2.1 Rubric for teachers' professional development

This study is beneficial to teachers, students, and schools in that it helps schools to understand the importance of focusing on teacher professional development. The entrepreneurial teacher plays a vital role in assisting the maintenance of a professional teaching force within the school. Schools may be interested in the ways of equipping teachers to be entrepreneurial teachers; however the professional development needs of fostering entrepreneurial teachers vary from person to person and from school to school. There are difficulties in the technical problems associated with measurement, and with validity and trustworthiness of understanding TEB at school.

According to the experience of developing the rubric, I decided to create a rubric of TEB as a practical contribution to this study. Although the discussion of TEB has grown rapidly, there is no standardized rubric for assessing entrepreneurial teachers in the education context. This is the practical research niche for a study of TEB. A TEB rubric is a useful tool for researchers and school authorities to study the links between entrepreneurial teachers with different prospects. With the support of this study's findings, I developed the rubric at the end of this study. Figure 7.5 shows that I further amended the rubric by considering the study's findings and conducting a further literature review as a mixed approach. Based on chapter seven 're-conceptualized TEB', I clarified the definition and features of six TEB. These definitions and features serve to illustrate what an entrepreneurial teacher should broadly embrace while developing a school-based curriculum. Table 7.20 indicates that I integrated definitions and features into the rubric. In order to verify the validity and trustworthiness of the rubric, I invited external reviewers and experienced teachers to modify it.

In a climate of intense school reform and competition among schools, schools are actively engaged in enhancing teachers' competencies in teaching and learning. The rubric for assessing entrepreneurial teachers enables individual teachers to make meaningful and

explicit self-evaluations of their professional experience and provides a useful tool for schools to evaluate teacher performance. It is the indicator that provides a direction for schools to design school-based teacher professional development frameworks.

Figure 7.5 Process of developing the rubric

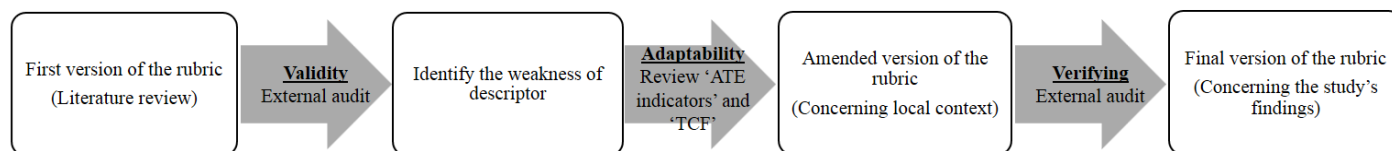


Table 7.20 Final version of the rubric for assessing entrepreneurial teachers in the education context

	TEB	Threshold	Competent	Proficient	Accomplished
Competencies	Coordination competency	Mainly follows previous practices when planning for a curriculum; has a vague idea of the expected outcomes of a curriculum; effectively implements the school-based curriculum.	Attempts with some success to deploy new curriculum; leads colleagues in the implementation of a school-based curriculum with sensible and well-organized management skills; has a direction in developing the curriculum.	Works in close collaboration with colleagues in curriculum adaptation and innovation to continue developing and improving the school-based curriculum as planned with consensus and self-reflection; leads colleagues with persistent direction and rigorous monitoring system.	Demonstrates curriculum leadership in the development of the school-based curriculum; makes active contributions to the school-based curriculum decisions with consensus and self-reflection; leads and conducts pilot sampling as a role model with a persistent direction; displays sensible and well-organized management skills in developing the curriculum.
	Strategic resources	Attends sharing and exchange sessions on teaching practice in specific subject areas within the school when invited to.	Participates voluntarily in attending sharing sessions; invites internal experts and makes sporadic contributions to the exchange of ideas on teaching practice in specific subject areas within the school	Participates actively in gaining support and knowledge from internal and external professional experts; disseminates other schools' good teaching practice within the school.	Takes the lead in gaining support and knowledge from internal and external professional experts; seeks financial sources and conducts an exchange of ideas on other schools' good teaching practice in specific subject areas within and outside the school.
	Innovation	Shows adequate knowledge of basic teaching pedagogy; able to give attention to and care about students' learning needs and performance	Shows rich knowledge and understanding of basic teaching pedagogy; demonstrates good teaching practices in the school-based curriculum.	Shows mastery of using different incremental teaching pedagogies; designs appropriate learning and teaching activities and experiences; actively contributes to modifying the school-based curriculum.	Effectively demonstrates and models excellent performance in contextualizing radical new teaching and learning pedagogy; continuously modifies the school-based curriculum for students to cater for learner diversity; develops new pedagogy from/to other subjects into the school-based curriculum
Attributes	Autonomy-enthusiasm	Regularly updates and searches for new subject matter knowledge with a view to enriching content knowledge of related subjects; Ready to participate in the process of formulating new school policies / reviewing the established procedures and practices when invited to.	Frequently updates and searches for new subject matter knowledge about current curriculum developments as well as emerging educational initiatives and priorities; Shows concern for formulating school policies.	Initiates updating and searching for new subject matter knowledge to achieve excellence in teaching and learning; Shows great concern for the formulation of the school-based curriculum; Commits and dedicates time to accomplishing the school-based curriculum.	Promotes updating of subject knowledge and searches for new subject knowledge in response to current curriculum developments and emerging educational initiatives; Makes substantial contributions to the planning and formulation of the school-based curriculum by expressing own views and giving concrete suggestions; Commits and dedicates time and personal resources to accomplish the school-based curriculum.
	Risk-taking	Makes occasional attempts to follow new pedagogy under the school's established policies and practices. (Ready to step out of comfort zone).	Pays attention to identifying an opportunity to promote new pedagogy while understanding the reasons behind established procedures and practices. (Steps out of comfort zone personally).	Appropriately identifies opportunities for promoting new pedagogy under school plans in agreement with school goals and policies; takes measures to address the impact of societal changes on school development. (Encourages colleagues to step out of their comfort zones).	Effectively identifies opportunities for promoting new pedagogy under uncertain conditions; Promotes awareness and knowledge of societal changes among colleagues for continuous school development. (Encourages all colleagues to step out their comfort zones against potential resistance).
	Humility-confidence	Maintains constant cordial relationships with colleagues, shows respect for others	Develops constructive working relationships with colleagues in a decent manner	Works with colleagues in an open and modest manner; shows initiative when sharing the ideas of the school-based curriculum with colleagues.	Takes a leading role and forms trusting relationships with colleagues in developing the school-based curriculum in a modest manner; has faith in performing and presenting the ideas of the school-based curriculum; sincerely considers colleagues needs.



7.4.2.2 Role of Principal leadership on enhancing TEB

The importance of this study is related to the role principal leadership plays in enhancing TEB. Although the principal leadership provides the structure with a broader and more holistic approach to furthering the impact of TEB, the study's findings show that the formal position of entrepreneurial teachers is also paramount for performing the entrepreneurial behavior. The merits of nurturing and enhancing TEB should be articulated in terms of providing authority and responsibility formally within schools, rather than by emphasizing teachers' autonomy. Without the formal position, the entrepreneurial teacher cannot mobilize resistant teachers by exercising authority and using school resources.

7.4.3 Contribution to policy issues

Policymakers will find this study beneficial for articulating the professional standards for teachers of Hong Kong (COTAP – T-standard). The Hong Kong government now promotes COTAP – T-standard⁺ that has been developed with the teaching profession for the growth of the profession. They state that teachers are the committed role models of professionalism (Keddie, 2018) and visionary 'Edupreneurs' of educational transformation and continuous school improvement. The meaning of 'Edupreneurs' is similar to entrepreneurial teachers, however, there is no concrete conceptual and operational definition of 'Edupreneurs' (Committee on professional development of teachers and principals, 2018). This study serves as a potential indicator for the policymakers, teachers, and principals to recognize the standard of being an entrepreneurial teacher.

7.5 Recommendations for further research

This study is limited by the number of cases and selected participants (a similar entrepreneurial behavior). This study focused on curriculum development at school, which limited the understanding of the impact of TEB at a large scale. Further, the scope of the research questions prohibited a close focus on the impact on student outcomes and student perceptions of TEB efficacy. These are the limitation that should be recognized.

As this study aimed to demonstrate the concrete conceptual framework of TEB at this stage, the depth of insight provided by multiple case research provides a meaningful and useful

measure of TEB. I hope this study might serve as a useful foundation for further studies in the field of TEB in the education sector.

This study attempts to draw the attention of theoreticians towards TEB at school by defining discovering, investigating the impact, and conditions of, TEB. I re-conceptualized TEB which is rich with possibilities for future research. With a view to addressing the intellectual contribution and further development of the field, table 7.21 indicates several themes emerging from this study, which suggest avenues for a range of issues that can be investigated in the future:

- How might entrepreneurial teachers perform this new conceptual framework of TEB in schools in different societies?

This study raises questions about the context of the education sector in defining TEB. I constructed a new conceptual framework of TEB. It would be illuminating to carry out a further study comparing different countries in order to explore whether entrepreneurial teachers perform these entrepreneurial behaviors in working with colleagues over time.

- How do this study's findings relate to all Hong Kong schools?

A future researcher can replicate this study with a different sampling frame to test the generalization across Hong Kong schools. This study clarifies the concept of TEB, its impact, and the conditions which enhance that behavior. With the foundation of this study, a future researcher can opt to engage in a longitudinal, mixed method, and/or quantitative research to test the generalization of TEB.

- Is there any other variable related to teacher entrepreneurial behavior, such as transformational, authentic, and empowering leadership?

While the study contributes to the literature of transformational leadership and TEB, future research work could pinpoint the quantitative relationship between principal leadership and teachers' entrepreneurial behavior; intending to understand the effect

on this relationship of such variables as transformational, authentic, and empowering leadership.

- Is there any other TEB profile in different schools' context, such as opinion leader, facilitator, champion, linking agent, change agent?

While the study contributes to identifying the various role of being entrepreneurial teachers from three schools' context, future research work could explore more TEB profile in other schools; intending to expand the understanding of the role of TEB by concerning teachers' position, schools' condition, and the process of generating an innovative idea.

The application of TEB is wide and complicated in changing educational contexts. Previous studies seldom explore the role of entrepreneurial teachers in developing teacher professionalism. This study clarifies the components related to teacher entrepreneurship and contributes to the understanding of how TEB effects the way entrepreneurial teachers enhance teachers' capacity and bottom-up innovation at school. These are some of the areas relating to middle leadership and school innovation which may lead to a potential investigation in the future. I hope that this thesis might serve as a useful foundation for further studies in the important field of teacher professionalism in schools.



Table 7.21 Links between research niches, contribution of study, and future research

Research niches	Intellectual contribution	Practical contribution	Policy contribution	Future research
TEB: Insufficient understanding of the definition of TEB	<ul style="list-style-type: none"> - Clarify, re-conceptualize and provide concrete explanation of entrepreneurial behavior to fit the school context. - Provide a new domain of studying TEB, humility-confidence. - Indicate the links between coordination competency and teachers' reflection. 	Rubric for teachers' professional development <ul style="list-style-type: none"> - Make meaningful and explicit self-evaluations of their professional experience. - Provide a useful tool for schools to evaluate teacher performance. - Design school-based teacher professional development frameworks. 	<ul style="list-style-type: none"> - Articulate the professional standards for teachers of Hong Kong (COTAP – T-standards). - Serve as a potential indicator for the policymakers, teachers, and principals to recognize the T-standard of Edupreneurs. 	How might entrepreneurial teachers perform this new conceptual framework of TEB in schools in different societies?
Impact of TEB: Variety of meanings of the impact of TEB between business and education sectors	<ul style="list-style-type: none"> - Clarify the role of entrepreneurial teachers in speeding up the promotion of organizational learning. - Understand how an entrepreneurial teachers' position in the school affects the scale of teachers' professional development. 			How do this study's findings relate to all Hong Kong schools?
Conditions for enhancing TEB: Lack of in-depth understanding of various conditions (e.g. leadership style)	<ul style="list-style-type: none"> - Validate and clarify the influence of transformational leadership on TEB. - Align with empirical business studies. 			Is there any other variable related to teacher entrepreneurial behavior, such as transformational, authentic, and empowering leadership?
Conditions for enhancing TEB: Needs of understanding the interactive relationship between schools' conditions and TEB	<ul style="list-style-type: none"> - Clarify how entrepreneurial teachers utilize the rigorous school culture with the hierarchical structure to engage other colleagues. 	<ul style="list-style-type: none"> - Articulate authority and responsibility of entrepreneurial teachers at school. 		



Table 7.22 Overview of the study of TEB

Research questions	Literature review	Research niches and methodology	Findings	Cross case findings and discussion	Intellectual contribution	Practical and policy contribution	Future research
How do teachers and leaders understand and enact TEB and its components?	<p>Temporary conceptual definition: TEB as a process of personal development in which a teacher demonstrates entrepreneurial behavior in creating new teaching and learning strategies at school.</p> <p>Operational definition: TEB refers to teachers who perform innovation, risk-taking, plan and manage a project, show autonomy with a positive attitude, and seek external resources.</p>	<p>Research niche: There is an insufficient understanding of the definition of TEB, it is valuable for me to explore this research niche in this study.</p> <p>Research methodology – Multiple-site case study: In-depth investigation is required to modify the operational definition of TEB. Case study can: 1. Understand personal experience and viewpoints by empathetic understanding. 2. Emphasize the inductive analysis for understanding patterns, themes, and interrelationships.</p>	<p>TEB:</p> <ul style="list-style-type: none"> - Coordination competency: Sensible and well-organized, Direction persistence, Rigorous consensus, Pilot sampling, Lead as a role model, and Self-reflection. - Innovation: Creativity, Contextualizing creativity, and Scaling of innovation. - Risk-taking: Identify potential risk, Recognise opportunities and Embrace tremendous change. - Autonomy-enthusiasm: Visionary, Autonomous, and Self-sacrificing. - Strategic resources: Expert support, Internal expertise, Financial sources, and Sharing teaching resources. - New items - Humility-Confidence: Humility, Confidence, and Genuine care. 	<p>Conceptual definition: TEB as a process of personal development which a teacher demonstrates entrepreneurial competencies and attributes in actualizing curriculum reform at school.</p> <p>Operational definition: TEB refers to the teacher performs the competencies of coordination competency, strategic resources, and innovation with the attributes of autonomy-enthusiasm, risk-taking, and humility-confidence at school.</p>	<ul style="list-style-type: none"> - Clarify, re-conceptualize and provide concrete explanation of entrepreneurial behavior to fit the school context. - Provide a new domain of studying TEB, humility-confidence. - Indicate the links between coordination competency and teachers' reflection. 	<p>Practical contribution - Rubric for teachers' professional development:</p> <ul style="list-style-type: none"> - Make meaningful and explicit self-evaluations of their professional experience. - Provide a useful tool for schools to evaluate teacher performance. - Design school-based teacher professional development frameworks. 	How might entrepreneurial teachers perform this new conceptual framework of TEB in schools in different societies?
How do they perceive TEB's impact in schools?	<p>There are five impacts of TEB while an expanding network for resources is unique to the education sector.</p> <ul style="list-style-type: none"> - General performance - Creating competitive advantage - Risk-taking with higher job satisfaction - Promote organizational learning - Expanding network for resources 	<p>Research niche: Various meanings of impacts in the business and education context: 2. Diverse context between the business and education sector.</p> <p>Research methodology - Multiple-site case study: The qualitative method may promote high relevancy in research, because of the nature of organization. Case study can: 1. Be conducted in the natural setting in order to understand the influence of context. 2. Emphasize the inductive analysis for understanding patterns, themes, and interrelationships.</p>	<p>Direct impact:</p> <ul style="list-style-type: none"> - Enhancing teachers' performance: Reflecting teaching performance with IT support, Stepping out of comfort zone, Taking the initiative, Fostering trust for coherence, and Reflecting teaching performance in reviewing and sharing. <p>Indirect impact:</p> <ul style="list-style-type: none"> - Nurturing students' growth: Nurturing self-management, Engaging in learning, Enhancing mathematic academic performance, and Nurturing students' positive attitude and life skills. - Cross subject knowledge transfer: Promoting organizational learning - Promoting schools uniqueness as a comparative advantage. 	<p>Direct impact – Enhancing teachers' performance:</p> <ul style="list-style-type: none"> - Working efficiency - Trusting relationship for teachers' coherence (New item) - Learning breakthrough - Sustainable innovation as a team <p>Indirect impact – Students' learning and growth:</p> <ul style="list-style-type: none"> - Engagement in learning (New item) - Learning performance <p>Indirect impact – School branding</p>	<ul style="list-style-type: none"> - Clarify the role of entrepreneurial teachers in speeding up and promoting organizational learning. - Understand how entrepreneurial teachers' position affects the scale of teacher professional development. 	<p>Policy contribution:</p> <ul style="list-style-type: none"> - Articulate the professional standards for teachers in Hong Kong (COTAP – T-standard). - Serves as a potential indicator for the policymakers, teachers, and principals to recognize the T-standard of Edupreneurs. 	How do this study's findings relate to all Hong Kong schools?
What school conditions enhance or challenge TEB?	<p>There are six school conditions affecting the impacts of TEB while rewarding and market orientation are unique conditions in the business sector.</p> <ul style="list-style-type: none"> - Principal's leadership - Formal entrepreneurial behavior course - Learning through doing - Flexible and open school culture - Communication network - Self-reflection 	<p>Research niche: Insufficient understanding of how conditions interact with TEB: 1. Lack of in-depth understanding of various conditions (e.g. Leadership style). 2. Need to understand the interactive relationship between schools' conditions and TEB.</p> <p>Research methodology - Multiple-site case study: There is a need to clarifying various conditions in the education sector, such as learning through doing activities, communication network, or ways of promoting reflection. Case study can: 1. Be conducted in the natural setting in order to understand the influence of context. 2. Understand personal experience and viewpoints by empathetic understanding.</p>	<ul style="list-style-type: none"> - Principal leadership: Providing administrative support, Providing direction, Giving staunch personal support, Empowerment coach. Rigorous monitoring and Systematic opportunity identification. - Organization culture and practice: Embedding trusting open culture and Rigorous operation system. - Communication network: Systematic communication network, formal communication, Informal communication, network expansion inside school, and network expansion outside school. 	<p>Principal leadership:</p> <ul style="list-style-type: none"> - Directionality - Empowering and facilitating entrepreneurial teachers - Individualized care and support (Transformational leadership) <p>School culture:</p> <ul style="list-style-type: none"> - Rigorous working manner - Embedding a trusting and open culture <p>Communication network Entrepreneurial teachers' position</p>	<ul style="list-style-type: none"> - Validate and clarify the influence of transformational leadership on TEB. - Align with empirical business studies. - Clarify how entrepreneurial teachers utilize the rigorous school culture with the hierarchical structure to engage other colleagues. 	<p>Practical contribution: Articulate authority and responsibility of entrepreneurial teachers in school.</p>	Is there any other variable related to teacher entrepreneurial behavior, such as transformational, authentic, and empowering leadership?



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Appendices one - Summary for empirical studies and reviewed articles in defining TEB and EEB

Author	Method use	Discipline	Study purpose	Subjects
Sayeed et al. (2003)	Quantitative	Business Sector	Identify the linkage between entrepreneurial behavior of the manager	101 middle managers
Dess et al. (2005)	Review	Business Sector	Categorize entrepreneurial behavior	3 entrepreneurial behavior model
Man et al. (2009)	Quantitative	Business Sector	Investigate the relationships between entrepreneurial characteristics and firm performance	153 owner/managers
Bosma et al. (2010)	Quantitative	Business Sector	Massive comparison of entrepreneurial behavior	10000 employees from 10 countries
Jain et al. (2013)	Review	Business Sector	Categorize entrepreneurial behavior	229 empirical studies
Weber et al. (2013)	Quantitative	Business Sector	Describe entrepreneurial behavior in job advertisements	437 job description
Rekha et al. (2014)	Quantitative	Business Sector	Describe entrepreneurial behavior in SMEs	376 SMEs
Rusu et al. (2014)	Review	Business Sector	Categorize entrepreneurial behavior	23 empirical studies
Davis et al. (2016)	Quantitative	Business Sector	Discover the personality of the entrepreneurial employee	1872 employees
Eyal et al. (2003)	Quantitative	Education Sector	Measure school entrepreneurship inventory	140 schools in Israel
Rherrad et al. (2008)	Quantitative	Education Sector	Describe university staffs' entrepreneurial behavior	1400 Canadian university staff
Borasi et al. (2010)	Qualitative	Education Sector	Investigate entrepreneurial teacher behavior	6 cases studies
Van Dam et al. (2010)	Quantitative	Education Sector	Identify individual entrepreneurial competencies	255 teachers from five vocational school
Oplatka (2014)	Qualitative	Education Sector	Identify teacher entrepreneurial behavior by studying their outstanding performance in curriculum planning	10 principals 30 teachers
Hayat et al. (2015)	Quantitative	Education Sector	Investigate TEB by students' perspective	1083 Pakistan students 1008 Finland students
Neto et al. (2018)	Quantitative	Education Sector	Assess the contributions of self-efficacy to entrepreneurial behavior	401 USA teachers



Appendices two - Summary for empirical studies and reviewed articles in the impact of TEB and EEB

Author	Method use	Discipline	Study purpose	Subjects
Covin et al., 1991	Quantitative	Business	Impact of EEB	111 SME in US
Pearce et al., 1997	Quantitative	Business	Impact of middle manager entrepreneurial behavior from subordinates perspective	1522 subordinate under 102 manager
Covin et al., 1999	Review	Business	Impact of EEB	Conceptual paper
Wiklund, 1999	Quantitative	Business	Relationship between entrepreneurial behavior and company performance	132 SME in Swedish with 3 years study
Kuratko et al., 2005	Review	Business	Impact of EEB	Three literature
Wiklund et al., 2005	Quantitative	Business	Impact of EEB	465 SMEs
Lim et al., 2008	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	374 Spanish firm
Molina et al., 2009	Review	Business	Entrepreneurial behavior contribution in learning	Conceptual article with article support
Rauch et al., 2009	Review	Business	Relationship between entrepreneurial behavior and company performance	51 studies
De Clercq et al., 2010	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	232 Canadian-based firm
Engelen et al., 2012	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	790 SMEs from 6 countries
Wales, 2013	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	258 SMEs
Jain et al., 2013	Review	Business	Contribution of various entrepreneurial behavior	229 Articles
Rae et al., 2013	Mixed	Business	Entrepreneurial employee reaction to adversity	50 businessmen (Eight educator)
Vishal et al., 2014	Quantitative	Business	Entrepreneurial behavior contribution in learning	500 business
Koene, 2006	Qualitative	Education	Entrepreneurial behavior in developing curriculum	22 teachers in India
Chand et al., 2006	Qualitative	Education	Impact of EEB	120 India teachers
Hayat et al., 2011	Quantitative	Education	Impact of TEB	200 students



Barakat et al., 2014	Quantitative	Education	Correlation among entrepreneurial behavior	28 enterprise (1086 postgraduate students from Cambridge)
Hietanen, 2015	Qualitative	Education	Entrepreneurial teacher performance in catering individual needs	13 teachers, 26 students in Finland
Martin et al., 2017	Quantitative	Education	Impact of TEB	74 teachers
Neto et al., 2017	Quantitative	Education	Relationship between TEB and job satisfaction	385 teachers



Appendices three - Summary for empirical studies and reviewed articles in developing TEB

Author	Method use	Discipline	Study purpose	Subjects
Brazeal, 1996	Quantitative	Business	Study the relationship between developing entrepreneurial behavior. rewarding system and leading	196 managers
Lans et al., 2004	Quantitative	Business	Testing the impact of various factors in nurturing entrepreneurial employees	17 companies (Catering)
Petrekis, 2005	Review	Business	Review the impact of organizational structure in developing entrepreneurial behavior	80 articles (2 articles about entrepreneurial behavior)
Christensen, 2005	Qualitative	Business	Study the relationship among developing entrepreneurial behavior, rewarding system and leading	Case study with 17000 employees
Brunaker et al., 2006	Qualitative	Business	Investigate team building for entrepreneurial behavior	One case study
Rutherford et al., 2007	Quantitative	Business	Testing the impact of various factors in nurturing entrepreneurial employees	264 employees
Soriano et al., 2007	Quantitative	Business	Study the impact of leadership on developing entrepreneurial behavior	100 companies
Lim et al., 2008	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	374 Spanish firm
De Clercq et al., 2010	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	232 Canadian-based firm
Mckeown, 2010	Qualitative	Business	Investigate the impact of entrepreneurial learning	170 employees
Ribeiro-Soriano et al., 2010	Review	Business	Review the impact of organizational culture	34 articles (6 articles about entrepreneurial behavior)
Bagheri et al., 2011	Review	Business	Build a conceptual framework for developing entrepreneurial behavior	68 articles
Gondim et al., 2011	Qualitative	Business	Study the relationship between affective commitment and entrepreneurial behavior	126 employees



Yaghoubi et al., 2011	Quantitative	Business	Study the impact of social capital on entrepreneurial behavior	383 employees from 4 companies
Engelen et al., 2012	Quantitative	Business	Relationship among entrepreneurial behavior, company performance, and other variables	790 SMEs from 6 countries
Mukherji et al., 2012	Quantitative	Business	Testing the coefficient factor of cognitive learning in entrepreneurial behavior	150 employees
Jain et al., 2013	Review	Business	Review the factor of nurturing risk-taking competence	229 articles
Moriano et al., 2014	Quantitative	Business	Study the impact of leadership on developing entrepreneurial behavior	186 employees from private and public organization
Nicoleta, 2014	Quantitative	Business	Study the impact of entrepreneurial course on entrepreneurial behavior	153 adult (3 month course)
Szczepańska-Woszczyna, 2015	Quantitative	Business	Study the impact of leadership on developing entrepreneurial behavior	120 managers
Davis et al., 2015	Quantitative	Business	Understand the impact of personality on entrepreneurial behavior	1872 employees
Nyello et al., 2015	Quantitative	Social work	Study structured educational experience for developing entrepreneurial behavior	233 social workers
Baggen et al., 2016	Quantitative	Business	Study on job entrepreneurial development	234 employees from 12 SMEs
Adekiya et al., 2016	Quantitative	Business	Investigate the impact of entrepreneurial learning	357 employees
Kor, 2016	Quantitative	Business	Understand the impact of personality on entrepreneurial behavior	404 employees from banking sector
Afsar et al., 2017	Quantitative	Business	Study the impact of entrepreneurial course on developing entrepreneurial behavior	557 employees and 64 leaders from 8 organization
Eyal et al., 2004	Quantitative	Education	Relationship between different leadership styles and alternative entrepreneurial strategies in the not-for-profit public school system.	140 Israeli elementary schools
Koene, 2006	Qualitative	Education	Entrepreneurial behavior in developing curriculum	22 teachers in India

Chand et al., 2006	Qualitative	Education	Impact of EEB	120 India teachers
Eyal. O 2008	Quantitative	Education	Study the association between a school's network and its entrepreneurial strategy	140 Israeli elementary schools
Dam et al., 2010	Quantitative	Education	Study the factor of enhancing teachers' adaptability through entrepreneurial learning	251 Dutch teachers
Gustafsson-Pesonen, 2012	Qualitative	Education	A case study of teacher training program - entrepreneurial learning project	40 teachers in Finland
Hassan, 2012	Quantitative	Education	Study the relationship between organizational climate and entrepreneurial teacher	92 teachers from 22 schools
Boon, 2013	Qualitative	Education	Investigate the impact of entrepreneurial training on teachers	3 principals and 6 teachers
Suzete et al., 2014	Quantitative	Education	Study the relationship among leadership and the entrepreneurial course on employees	380 employees from two higher education institutions
Katariina, 2015	Qualitative	Education	Investigate various factor of nurturing TEBs	23 teachers from different sectors
Kasule et al., 2016	Mixed	Education	Study the impact of entrepreneurial course on developing entrepreneurial behavior	20 department heads, 90 administrative staff, 126 teaching staff from one university
Kurniawan et al., 2017	Quantitative	Education	Study organizational climate in developing TEB	394 teacher from 14 private school in Indonesia
Khorrami et al., 2018	Quantitative	Education	Investigate determinant competencies of emerging educators' entrepreneurial behavior in the Institute of Agricultural Applied Scientific Education (IAASE).	123 faculty members



Appendices four - First version of the rubric in assessing TEB:

Criteria	Fail	Weak	Pass	Credit	Distinction
Innovation	No illustrate excellent performance in developing effective teaching and learning the school-based curriculum.	Inadequate illustrate excellent performance in developing effective teaching and learning the school-based curriculum.	Some illustrate excellent performance in developing effective teaching and learning the school-based curriculum.	Appropriate illustrate excellent performance in developing effective teaching and learning the school-based curriculum.	Effective illustrate excellent performance in developing effective teaching and learning the school-based curriculum.
Risk-taking*	No identify an opportunity for promoting new school-based curriculum at school under uncertain situations.	Minimal identify an opportunity for promoting new school-based curriculum at school under uncertain situations.	Fairly identify an opportunity for promoting new school-based curriculum at school under uncertain situations.	Appropriate identify an opportunity for promoting new school-based curriculum at school under uncertain situations.	Effective identify an opportunity for promoting new school-based curriculum at school under uncertain situations.
The ability to plan and manage a project	No demonstrate excellent performance in curriculum planning and implementation.	Inadequate demonstrate excellent performance in curriculum planning and implementation.	Some demonstrate excellent performance in curriculum planning and implementation.	Appropriate demonstrate excellent performance in curriculum planning and implementation.	Effective demonstrate excellent performance in curriculum planning and implementation.
Autonomy with a positive attitude*	Irrelevant for leading schools for excellence and improvement in curriculum development, learning and teaching.	Minimal for leading schools for excellence and improvement in curriculum development, learning and teaching.	Some for leading schools for excellence and improvement in curriculum development, learning and teaching.	Relevant for leading schools for excellence and improvement in curriculum development, learning and teaching.	Highly relevant for leading schools for excellence and improvement in curriculum development, learning and teaching.
Seeking external resources	No demonstrate maximize network for gathering resources.	Inadequate demonstrate maximize network for gathering resources.	Some demonstrate maximize network for gathering resources.	Appropriate demonstrate maximize network for gathering resources.	Effective demonstrate maximize network for gathering resources.

*These items are difficult to assess from the booklet. Therefore, I modify Chief's executive award for teaching excellence's assessing criteria to fit into this rubric by concerning the literature review.



Appendices five – Ranking of awarded schools

School	Judges	Innovation	Risk-taking	The ability to plan and manage a project	Autonomy with a positive attitude	Seeking external resources	Sub-total	Total	Ranking
Awarded school 1	I	2	0	3	2	0	7	24	17
	Judges A	2	0	4	2	0	8		
	Judges B	2	1	3	2	1	9		
Awarded school 2	I	3	2	3	4	3	15	47	6
	Judges A	3	2	4	4	3	16		
	Judges B	3	2	4	4	3	16		
Awarded school 3	I	2	0	2	2	0	6	16	18
	Judges A	2	0	2	2	0	6		
	Judges B	1	0	2	1	0	4		
Awarded school 4	I	3	3	4	3	2	15	49	5
	Judges A	3	4	4	3	3	17		
	Judges B	4	3	4	4	2	17		
Awarded school 5	I	3	3	4	3	2	15	46	7
	Judges A	3	3	4	3	2	15		
	Judges B	3	4	4	3	2	16		
Awarded school 6	I	2	2	4	4	3	15	43	10
	Judges A	2	2	3	3	3	13		
	Judges B	2	2	4	4	3	15		
Awarded school 7	I	3	4	4	3	3	17	53	2
	Judges A	3	4	4	4	3	18		
	Judges B	3	4	4	4	3	18		
Awarded school 8	I	3	1	1	3	1	9	30	14
	Judges A	3	1	1	3	2	10		
	Judges B	3	2	1	3	2	11		
Awarded school 9	I	4	2	4	2	1	13	37	12
	Judges A	4	2	3	2	1	12		
	Judges B	4	2	4	1	1	12		
Awarded school 10	I	4	4	4	3	4	19	55	1
	Judges A	4	4	4	4	3	19		
	Judges B	4	4	3	3	3	17		
Awarded school 11	I	2	1	3	2	1	9	26	16
	Judges A	2	1	3	2	1	9		
	Judges B	2	1	2	2	1	8		
Awarded school 12	I	4	3	4	3	3	17	50	4
	Judges A	4	3	4	3	2	16		
	Judges B	4	3	4	3	3	17		

Awarded school 13	I	4	2	4	4	3	17	45	9
	Judges A	3	2	3	3	3	14		
	Judges B	2	2	4	3	3	14		
Awarded school 14	I	2	1	3	2	2	10	30	14
	Judges A	2	1	3	2	2	10		
	Judges B	2	1	3	2	2	10		
Awarded school 15	I	3	3	4	3	4	17	51	3
	Judges A	3	3	4	3	4	17		
	Judges B	3	3	4	3	4	17		
Awarded school 16	I	4	2	2	2	3	13	39	10
	Judges A	4	2	3	2	2	13		
	Judges B	4	3	2	2	2	13		
Awarded school 17	I	4	2	4	3	3	16	46	11
	Judges A	4	1	3	3	3	14		
	Judges B	4	2	3	3	4	16		
Awarded school 18	I	3	2	2	2	2	11	33	13
	Judges A	3	2	2	2	2	11		
	Judges B	3	2	2	2	2	11		

Appendices six – Participation of awarded schools

School	Ranking	Method of accessing participants	Gatekeeper	Result	Name of sample school
Awarded school 2	6	Referral	Principal	Rejected	
Awarded school 4	5	Referral	Researcher's wife	Accepted	Sample school D
Awarded school 5	7	Referral	Awardees	Rejected	Rejected
Awarded school 7	2	Cold call	Awardees	Accepted	Sample school A
Awarded school 10	1	Cold call	Awardees	Accepted	Sample school B
Awarded school 12	4	Cold call	Awardees	Accepted	Sample school C
Awarded school 15	3	Cold call	Awardees	Rejected	

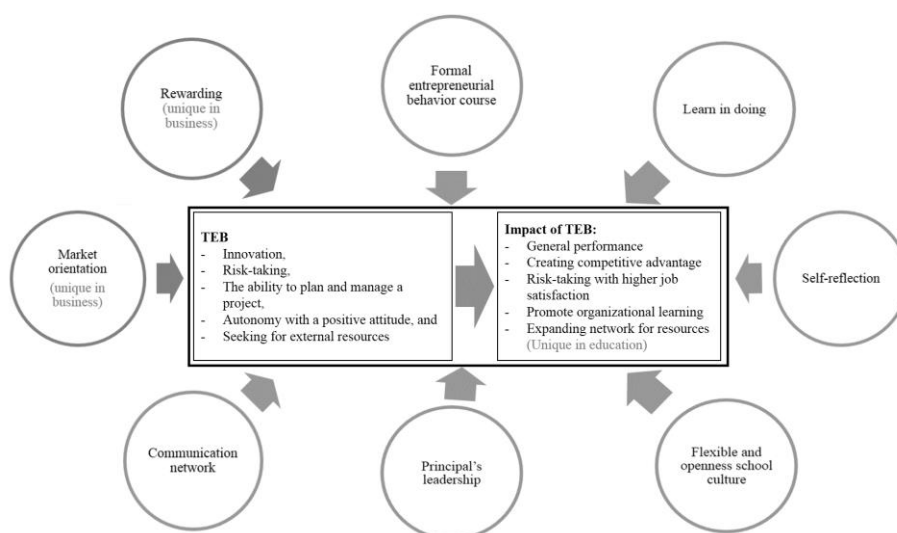
Appendices seven – Interview guide for participant and interview question

The principle of the interview:

1. Avoiding negative outcomes - Be careful of the wording in all interviews' questions, such as not being intrusive, inappropriate, offensive.
2. Avoiding leading questions
3. Avoiding close-end questions
4. Participants have the right to know about research before the interview.
5. Personally identifiable data should be kept confidential.

The rationale for designing questions' sequence:

1. I explain the purpose of the study in advance.
2. The interview will be started with the impact of their outstanding performance because it is easy for teachers to recall the latest experiences by some evidence.
3. By reflecting the impact of their excellent performance, teachers can associate what they have done and how the process of implementing new teaching and learning school-based curriculum (Enactment of entrepreneurial behavior). This facilitating teacher to describe what sort of condition influence their behavior and how they enact entrepreneurial behavior at school.
4. Finally, I approach teachers' view of TEB.



Interview for the awardee Background and impact of TEB
Market orientation: What is the rationale for promoting new teaching and learning school-based curriculum at school?
General performance: How do students benefit from new teaching and learning school-based curriculum in term of academic or another aspect?
After you promote the new teaching and learning the school-based curriculum, Organizational learning and creating competitive advantage: Is there any benefit for schools? Probing: Such as creating competitive advantage among schools, promoting organizational learning among colleagues?
Risk-taking with higher job satisfaction: What is the impact on you? Probing: Enhance your confidence in trying new things or higher satisfaction?

Implementation
You are excellent in promoting new teaching and learning school-based curriculum at school. Risk-taking, Autonomy with a positive attitude,

and seeking for external resources: What sort of personality drive you to do this? Probing: Willing to try new things? Positive and autonomy? Outgoing?
Innovation and the ability to plan and manage a project: What kind of capacity you think is relevant for promoting this new teaching and learning school-based curriculum? Probing: Innovation? Ability to plan and manage a project? Any others?
Is there any rewarding attract you to try new teaching and learning school-based curriculum?
During implementation, you must face various difficulties; I will ask the following question to see whether these conditions enhance or impede your work. Leadership: Anyone supports your new teaching and learning school-based curriculum? How? Probing: Principal/Panel?
Learn in doing: Are there any opportunities for you to acquire skills or knowledge to promote new teaching and learning school-based curriculum at school?
Organizational culture: According to schools' culture, what drive you to develop new teaching and learning school-based curriculum?

Communication network: Is there any communication network inside/outside schools facilitating you to promote new teaching and learning school-based curriculum?
Expanding network for resources: Will these networks benefit to gaining more resources?
Self-reflection: What will you do before/while facing difficulties in implementing new teaching and learning school-based curriculum? Probing: Reflection the possibility and figure the solution

Defining TEB
Formal entrepreneurial behavioral course: Did you know what TEB is before, from schools or outside? Any course?
Conceptual definition: How do you define TEB?



Interview for colleagues Background and impact of TEB
General performance: How do students benefit from new teaching and learning school-based curriculum in term of academic or another aspect?
After the awardees promote the new teaching and learning the school-based curriculum, Organizational learning and creating competitive advantage: Is there any benefit for schools? Probing: Such as creating competitive advantage among schools, promoting organizational learning among colleagues?
Risk-taking with higher job satisfaction: What is the impact on you? Probing: Enhance your confidence in trying new things or higher satisfaction?
Organization learning: Do you acquire anything new with the awardees? Or motivate you to learn from others?

Implementation
The awardees are excellent in promoting new teaching and learning school-based curriculum at school.

Risk-taking, Autonomy with a positive attitude, and seeking external resources: What sort of personality drive awardees to do this? Probing: Willing to try new things? Positive and autonomy? Outgoing?
Innovation and the ability to plan and manage a project: What kind of capacity you think is relevant for promoting this new teaching and learning school-based curriculum? Probing: Innovation? Ability to plan and manage a project? Any others?
Is there any rewarding attract awardee to try new teaching and learning school-based curriculum?
During implementation, awardees must face various difficulties; I will ask the following question see whether these conditions enhance or impede your work. Leadership: Anyone support awardees new teaching and learning school-based curriculum? How? Probing: Principal/Panel?
Learn in doing: Are there any opportunities for awardees to acquire skills or knowledge to promote new teaching and learning school-based curriculum at school?
Organizational culture: According to schools'

culture, what drive awardees to develop new teaching and learning school-based curriculum?
Communication network: Is there any communication network inside/outside schools facilitating awardees to promote new teaching and learning school-based curriculum?
Expanding network for resources: Will these networks benefit to gaining more resources?
Self-reflection: What will awardees and you do before/while facing difficulties in implementing new teaching and learning school-based curriculum? Probing: Reflection the possibility and figure the solution

Defining TEB
Formal entrepreneurial behavioral course: Did you know what TEB is before, from schools or outside? Any course?
Conceptual definition: How do you define TEB?



Interview for the Principal Background and impact of TEB
General performance: How do students benefit from new teaching and learning school-based curriculum in term of academic or another aspect?
After the awardees promote the new teaching and learning the school-based curriculum, Organizational learning and creating competitive advantage: Is there any benefit for schools? Probing: Such as creating competitive advantage among schools, promoting organizational learning among colleagues?
Organization learning: Since there is an outstanding teacher, what is the changes to the teacher team? Probing: Inspire/motivate other teachers to acquire new knowledge and skill in developing new things?

Implementation
The awardees are excellent in promoting new teaching and learning school-based curriculum at school. Risk-taking, Autonomy with a positive attitude, and seeking external resources: What sort of personality drive awardees to do this?

Probing: Willing to try new things? Positive and autonomy? Outgoing?
Innovation and the ability to plan and manage a project: What kind of capacity you think is relevant for promoting this new teaching and learning school-based curriculum? Probing: Innovation? Ability to plan and manage a project? Any others?
Are there any rewarding attract awardees to try new teaching and learning school-based curriculum?
During implementation, awardees must face various difficulties; I will ask the following question to see whether these conditions enhance or impede your work. Leadership: Many studies reveal that principal leadership has a great influence on teachers' performance. What have you done for supporting teachers in promoting new school-based curriculum under your leadership?
Learn in doing: Are there any opportunities for awardees to acquire skills or knowledge to promote new teaching and learning school-based curriculum at school?
Organizational culture: How do you define your schools' culture? How this culture facilitate the awardees promote new teaching and learning

school-based curriculum?
Communication network: Is there any communication network inside/outside schools facilitating awardees to promote new teaching and learning school-based curriculum?
Expanding network for resources: Will these networks benefit to gaining more resources?
Self-reflection: What will awardees and you do before/while facing difficulties in implementing new teaching and learning school-based curriculum? Probing: Reflection the possibility and figure the solution

Defining TEB
Formal entrepreneurial behavioral course: Did you know what TEB is before, from schools or outside? Any course?
Conceptual definition: How do you define TEB?



Appendices eight - Example of initial analysis check list

Initial analysis check list (Case 1):

Responds to RQ	Theme/Pattern	Answered	Evidence
Defining TEB	Innovation	✓	✓
	Risk-taking	✓	✓
	The ability to plan and manage a project	✓	✓
	Autonomy with a positive attitude	✓	✓
	Seeking external resources	x	x
	Trust among colleagues (New items)	✓	✓
Impact of TEB	Enhancing general performance	✓	✓
	Creating competitive advantage	✓	✓
	Risk-taking with higher job satisfaction	✓	x
	Promote organizational learning	x	x
	Expanding network for resources	x	x
	Enhance colleagues' sense of responsibility	✓	x
Schools' condition	Principal's leadership	✓	✓
	Formal entrepreneurial behavior course	x	x
	Learning through doing	✓	✓
	Flexible and openness school culture	✓	✓
	Communication network	✓	x
	Self-reflection	x	x
	Rewarding	x	x
	Market orientation	✓	✓
	Technical support	✓	✓
	Catholic school	✓	x

Initial analysis check list (Case 2):

Responds to RQ	Theme/Pattern	Answered	Evidence
Defining TEB	Innovation	✓	✓
	Risk-taking	✓	✓
	The ability to plan and manage a project	✓	✓
	Autonomy with a positive attitude	✓	✓
	Seeking external resources	✓	✓
	Trust among colleagues (New items)	✓	✓
Impact of TEB	Enhancing general performance	✓	✓
	Creating competitive advantage	✓	✓
	Risk-taking with higher job satisfaction	✓	x
	Promote organizational learning	✓	x
	Expanding network for resources	x	x
	Enhance colleagues' sense of responsibility	✓	x
Schools' condition	Principal's leadership	✓	✓
	Formal entrepreneurial behavior course	x	x
	Learning through doing	✓	✓
	Flexible and openness school culture	✓	✓
	Communication network	✓	x
	Self-reflection	x	x
	Rewarding	x	x
	Market orientation	x	x

Initial analysis check list (Case 3):

Responds to RQ	Theme/Pattern	Answered	Evidence
Defining TEB	Innovation	✓	✓
	Risk-taking	✓	✓
	The ability to plan and manage a project	✓	✓
	Autonomy with a positive attitude	✓	✓
	Seeking external resources	✓	✓
	Trust among colleagues (New items)	✓	✓
Impact of TEB	Enhancing general performance	✓	✓
	Creating competitive advantage	✓	✓
	Risk-taking with higher job satisfaction	✓	x
	Promote organizational learning	x	x
	Expanding network for resources	x	x
	Enhance colleagues' sense of responsibility	✓	x
Schools' condition	Principal's leadership	✓	✓
	Formal entrepreneurial behavior course	x	x
	Learning through doing	✓	✓
	Flexible and openness school culture	✓	✓
	Communication network	✓	x
	Self-reflection	x	x
	Rewarding	✓	x
	Market orientation	✓	✓

Appendices nine - Sample of encoding data

Questions and answers	Descriptive codes	Interpretive codes	Pattern coding
	(Factual things)	(Personal feelings)	(Framework for analysis)
<p>Mr Ho: That's right. It is amazing. I found that male teachers play the role of mathematics god and king. That's is so funny that students love this practice. In fact, what is the benefit of promoting the new school-based curriculum to students?</p> <p>Core member B: I think it is about tailor-making. Actually,... This must be something that students like it. If they don't like it, it is meaningless to do such tailor-making things. As you said, the benefit for students, I think it works for them. Of course, there is some room for us to improve. When we show up the image of mathematics god and king, they are willing to play with you. Then, it is your chance to teach them something. First, they like it. Second, they are interested in it. You will be a star for them. They follow what you have been done. That's easy for them to understand the concept, calculation, problem-solving, etc.</p>	<p>Event 3</p> <p>Formalizing teacher character: [When we show up the image of mathematics god and king, they are willing to play with you.]</p>	<p>Constructing a positive learning atmosphere for students: [it is your chance to teach them something. First, they like it. Second, they are interested in it. You will be a star for them. They follow what you have been done. That's easy for them to understand the concept, calculation, problem-solving, etc.]</p>	<p>Students engaging in learning: [When we show up the image of mathematics god and king, they are willing to play with you. Then, it is your chance to teach them something.]</p>



Appendices ten – Code book

Descriptive codes (Factual things)		Interpretive codes (Personal feelings)		Pattern coding (Framework for analysis)	
Code name	Description	Code name	Description	Code name	Description
Developed subject-based curriculum	Teachers designed a subject-based curriculum for students by concerning students' ability, interests, and school context, etc.	Concern students' learning	Teachers concern students' learning difficulties and performance.	Autonomy	Teachers take the initiative to complete the assigned task or personal goals.
Developed teaching materials	Teachers designed a tailor-made teaching and learning materials for students.	Problem-solving	Based on the problem recognized, teachers try to figure out the solution for the challenge.	Common Good (Visionary)	Teachers have a moral purpose in education.
Formalizing teacher character	Teachers deliberately cultivate an outstanding character for their teacher in the subject.	Identify the problem	Teachers identify the problem in traditional teaching or activity.	Creativity	It is the process for teachers to gather idea.
Drama for students (Moral education)	There is a drama show for students to understand some complicated idea with a specific scenario.	Constructing a positive learning atmosphere for students	Teachers cultivated a constructive learning atmosphere by forming an interactive and positive relationship with students in learning.	Opportunity recognition	Teachers foresee the opportunity in the uncertainty situation.
Colleagues imitate new pedagogy	Other subject colleagues imitate or integrated	Moral education	Teachers integrated moral education in teaching and learning.	Enhancing engagement in learning	Students are willing to learn in/after lesson actively.



	entrepreneurial teachers' new pedagogy into their teaching.				
The core team for innovation	There is a form core team in designing a new pedagogy and possibility of implementation.	Confidence with positive reinforcement	Teachers have confidence in implementing new teaching and learning pedagogy with successful experience.	(In/After lesson)	Teachers tried to transfer some professional knowledge to try new things.
Difficulties in technical problem	Teachers encounter technical difficulties in implementation.	Enhancing colleagues participation	Colleagues can join the new pedagogy freely or contribute the new idea.	Transferring knowledge into other aspects	The principal has an operational direction for teachers to obtain in the school year.
Apply for funding	Teacher applies funding to support new teaching and learning pedagogy.	Having a core team member	There is a core team for developing new teaching and learning pedagogy	Providing direction	There is a foreseeable risk in trying new things.
School promotion	The school promotes the new teaching and learning pedagogy in different media as a school promotion.	Principal minimize intervention	The principal doesn't take any intervention unless it affects the direction or leads to bad influence.	Potential risk	Teachers found higher satisfaction in implementing new teaching and learning pedagogy.
Expertise in the specific area	Some teachers have specific talent except teaching.	Clear focus in new pedagogy	Entrepreneurial teachers have a clear operational and direction in implementing new pedagogy.	Job satisfaction	Principal takes the active role in participating the functions and recognize colleagues contribution.



Student participation in developed teaching materials	Students have an opportunity for suggesting new teaching and learning pedagogy for the teacher.	Time tolerance	Teachers have reasonable time space to complete the task.	Giving staunch personal support	Other teachers are intent to try the new pedagogy.
Co-planning session	There is a session for teachers to discuss the implementation of teaching and learning.	Enthusiastic to try new tasks	Teachers are willing to try new things and enjoy the process.	Facilitating teacher trying new things	Teachers decided colleagues' role in participating new pedagogy.
Reducing workload by school policy	School authority reduces teachers' workload for developing new task.	Smalls step	Teachers developed a pilot project and expanded the new pedagogy step by step.	Understanding colleagues ability and character	Colleagues can join and contribute to new teaching and learning pedagogy.
Collecting other schools information	Entrepreneurial teacher collects other schools' resources to review school teaching and learning.	Sensitive for new trends	Teachers have a strong sense to explore news trends for students and teaching.	Sense of ownership	The principal encouraged teachers to try new pedagogy and clear the barriers for teachers.
Teacher training	There is training for the teacher to acquire new teaching and learning pedagogy.	Low profile with the goal	Entrepreneurial teachers don't have a higher exposure in showing themselves, but they are target oriented.	Providing administrative support	Teachers spent extra time and personal resource to perform the new pedagogy.
Student Performance	Students' performance is the measures to review the effectiveness of new teaching and learning	Enjoy teamwork	Teachers enjoyed the process of working with others.	Self-sacrificing	Teachers have an in-depth discussion on the new teaching and learning pedagogy with a core team member.



	pedagogy.				
School decision-making process	The school has a system to decide on new teaching and learning pedagogy.	Open-minded	Teachers listened to others' suggestion for the new task or amendment.	Collective decision-making process with core team member (Flexibility)	Subject teachers can voice out their concern in the formal and informal communication channel.
Religion background	There is religion background from the school sponsoring party or teachers.	Identify colleagues talent	Entrepreneurial teachers understand and identify colleagues' talent.	Embedding openness culture	Teachers have determination in completing the task and stick to the focus of implementing the new pedagogy.
Developed School-based curriculum	Teachers designed a subject-based curriculum for students by concerning students' ability, interests, and school context, etc.	Students improvement is shown	Teachers realized students' improvement in academic and whole person development.	Persistent	Entrepreneurial teachers were flexible in meeting the deadline and allocating resources, etc.
Teacher overload	Teacher has various duties. They are overload with teaching and administration work.	Systematic management style	The entrepreneurial teacher is a systematic leader in managing their team.	Flexibility (Collective decision-making process with core team member)	There is a seed project at school and treat as an example for colleagues to follow.
Expertise support outside school	School leader invites external expertise to support teacher in developing school-based curriculum.	Higher autonomy in designing task	The teacher enjoys higher flexibility in designing the task content.	Seed project for sampling (Starting with small step) Enhancing academic	Students have an in-depth understanding of the subject knowledge under the new pedagogy.



Helping new colleague to adopt	There is a workshop and follow up to train up a new teacher.	Reflecting task process	The entrepreneurial teacher reflects the operation of new pedagogy.	performance	
School-based internal sharing system	There is an internal sharing system for teachers to share information and new pedagogy.	Trustworthy relationship	Colleagues trust entrepreneurial teachers. Or Colleagues trust each other.		An entrepreneurial teacher inspired colleagues to learn or imitate their competencies.
Barriers of promoting school-based curriculum	There are various barriers for teachers to promote school-based curriculum.	Leading as a role model	Principal or teachers try new teaching and learning pedagogy actively.	Colleagues learn new competencies	There is a formal communication facilitating teachers exchange information in implementing or discuss new pedagogy.
Regular overview subject performance	Principal and teacher review the school policy and subject operation regularly to identify weakness and potential development.	Recognize teachers' innovative idea	School authority recognizes teachers' innovative idea in action.	Formal communication channel	Based on the problem recognized, the teacher will find the expert to learn or solve the problem.
Mentor-mentee relationship	There is a mentor for the entrepreneurial teacher to develop their profession.	Cherish human resources	School authority treats teacher as a valuable asset for schools that concern their healthiness and activeness.	Seek expertise help	Teachers explored financial or teaching material for implementing new pedagogy form other authority.
Lesson Study	School conducts a lesson study for teachers as a professional	Motivating other subjects	Entrepreneurial teachers motivate others subjects because of their	External resources	Schools highlight the impact of their uniqueness to the public as an ironic symbol



	development community inside the school.		successful experience.		
Knowledge management	School employs knowledge management in school operation.	Gaining experience from the expertise	Teacher gains insight and experience from an outsider.	Branding	Teachers treated students' improvement as their reward in educating students.
STEM education	Teacher decides to implement STEM education.	Sense of responsibility	Teacher has a strong sense of responsibility for completing the task.	Job satisfaction as rewarding	The teacher develops unique resources which are suitable for their schools. This resource distinguishes them from other schools.
Students general performance	The changes in students learning and behavior at schools.	Strong insight	Teacher/leader have an insight in developing school development.	Unique	Colleagues reflect on their teaching because of the new teaching and learning pedagogy.
TSA	Teacher express their view on TSA.	Concern students' growth	Teacher concern students' growth especially the living skills.	Trigger colleagues reflection Sensible and well-organized	Entrepreneurial teachers are well-organized in their department, and other colleagues will follow their instruction.
Future development	Teacher's view on the school future development	Closely monitoring	Principal or entrepreneurial teachers closely monitor the process of reform by providing direction.		



ESR	The school was selected to participate ESR.	Teacher personal network	Teacher has a network with an outsider for gaining teaching and learning idea.		Entrepreneurial teachers concern for practicing critically, making decisions about what to do next, judging the success of the exercise during the process.
Guiding colleagues to identify their vision	Senior management guides colleagues to identify their vision in teaching.	A close relationship with students	Principal and teachers have a close relationship with students.	Reflection in action	There is a network outside of the school to develop teacher competence in teaching.
Competition for reviewing performance	Teacher participated in the competition for reviewing performance.	Data mining	Teacher has data mining before taking action. Reviewing successful QEF applicant.	Network outside school	The teacher doesn't want to have a higher exposure at schools.
Long-service	Teacher serves in school for a long time.	Documentary	School develops a documentary system for colleagues.	Humility	The teacher believes in their professional judgment.
Information sharing system	Teacher has a regular meeting for information sharing.	Concern teacher feeling	Teacher cares other feelings in promoting new teaching and learning pedagogy.	Confidence	The religion background foster/strengthen the trustworthy relationship among teachers.
Teacher administration duty	Teacher was assigned to specific teaching performance.	A close relationship with colleagues	There is a close relationship among colleagues.	Influence from religion belief	Principal empowers the teacher to take an important role at schools.
		Trial and error	Trial and error	Trial and error	Empowerment
				Internalizing expertise experience	Teacher internalized expertise experience to be school-based teaching and



		learning pedagogy.
	Rigorous working environment	There is a clear guideline for all teachers, who complete task decently and carefully.
	Trust	Teacher commit to each others as a partner.
	Enhancing students generic skill	Students acquired generic skill to perform in learning and living. It facilitate their personal growth.
	Colleagues initiative	Colleagues take initiative to complete try new things.
	Innovation facilitator	Teacher helps colleagues to generate new idea.
	Genuine care	Leader concern teacher feeling in expressing opinion and performing duty.
	Students' self-behavior	Students become more self-discipline
	Rewarding	Teacher take the innovation as a chance to promote.
	Informal communication channel	Teacher employ inform communication channel to communicate with teachers.



Appendices Twelve - Sample of Consent Form

Consent Form and Information Sheet for PARTICIPANTS

THE EDUCATION UNIVERSITY OF HONG KONG
Department of Education Policy and Leadership

CONSENT TO PARTICIPATE IN RESEARCH

Teachers' entrepreneurial behavior and its impact in school: Cases studies in Hong Kong

I _____ hereby consent to participate in the captioned research supervised by Dr. Darren Bryant and conducted by Mr Ho Chun Sing, who are staff of Department of Education Policy and Leadership in The Education University of Hong Kong.

I understand that information obtained from this research may be used in future research and may be published. However, my right to privacy will be retained, i.e., my personal details will not be revealed.

The procedure as set out in the **attached** information sheet has been fully explained. I understand the benefits and risks involved. My participation in the project is voluntary.

I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without negative consequences.

Name of participant

Signature of participant

Date



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INFORMATION SHEET

Teachers' entrepreneurial behavior and its impact in school: Cases studies in Hong Kong

You are invited to participate in a project supervised by Dr. Darren Bryant and conducted by Mr. Ho Chun Sing who are the staff of the Department of Education Policy and Leadership in The Education University of Hong Kong.

This research aims to investigate the impact of teachers' entrepreneurial behavior. The awardees of Chief executive Award for teaching excellence and teacher award for business and financial education is the targeted participants. Three schools are invited to participate in this research. The researcher will study awardees' plan and report and interview with awardees. According to awardees' recommendation, the researcher will interview his/her colleagues and principals. In general, 8-10 participants (Including awardees and principal) will be invited to the interview session. The duration of the interview is around one to two hours and audio-taped. The researcher will make an appointment with teachers and principal. Interviewee may be asked to provide examples of their entrepreneurial behavior in action, such as students' work, lesson observation and schools' supporting, etc.

Your participation in the project is voluntary. You have every right to withdraw from the study at any time without negative consequences. All information related to you will remain confidential and will be identifiable by codes known only to the researcher. The study involves no potential risk for you. The researcher will publish the result in the doctor of education thesis and journal articles.

If you would like to obtain more information about this study, please contact Mr. Ho Chun Sing, Maxwell at telephone number 2948 8937 or their supervisor Dr. Darren Bryant at telephone number 2948 8827.

If you have any concerns about the conduct of this research study, please do not hesitate to contact the Human Research Ethics Committee by email at hrec@eduhk.hk or by mail to Research and Development Office, The Education University of Hong Kong.

Thank you for your interest in participating in this study.

Mr. Ho Chun Sing, Maxwell
Principal Investigator

香港教育大學
教育政策及領導學系

參與研究同意書

教師創業行為及其對學校的影響：香港個案研究

本人_____同意參加由白達仁博士負責監督,何振聲先生執行的研究項目。他們是香港教育大學教育政策及領導學系的教員。

本人理解此研究所獲得的資料可用於未來的研究和學術發表。然而本人有權保護自己的隱私,本人的個人資料將不能洩漏。

研究者已將所附資料的有關步驟向本人作了充分的解釋。本人理解可能會出現的風險。本人是自願參與這項研究。

本人理解我有權在研究過程中提出問題,並在任何時候決定退出研究,更不會因此而對研究工作產生的影響負有任何責任。

參加者姓名:

參加者簽名:

日期:

有關資料

教師創業行為及其對學校的影響：香港個案研究

誠邀閣下參加白達仁博士負責監督, 何振聲先生負責執行的研究計劃。他們是香港教育大學教育政策及領導學系的教員。

是次研究的目標, 為調查教師創業行為對學校的影響。行政長官卓越教學獎及企業理財教師長的得獎者是本次研究對象, 共有三所學校會被邀請參與研究。研究人員會分析獲獎教師的計劃書、及訪問得獎者。根據獲獎教師推薦, 研究人員會訪問相關同事及校長。整個研究約有八至十位教師(包括獲獎教師及校長)參與訪問。訪問時間約一至兩小時, 內容會被錄音, 研究人員會聯絡教師及校長安排訪問時間。在訪問過程中, 希望受訪者能提供相關證明/資料, 以支持訪問提及的內容, 例如同學的作品、學校支援的文件或安排觀課/活動等。

閣下的參與純屬自願性質。閣下享有充分的權利在任何時候決定退出這項研究, 更不會因此引致任何不良後果。凡有關閣下的資料將會保密, 一切資料的編碼只有研究人員得悉。這項研究不會對你構成任何風險。最終成果會集結為博士論文, 並輯錄於國際學術期刊。

如閣下想獲得更多有關這項研究的資料, 請與何振聲先生聯絡, 電話 2948 8931 或聯絡其導師白達仁博士, 電話 2948 8827。

如閣下對這項研究的操守有任何意見, 可隨時與香港教育大學人類實驗對象操守委員會聯絡(電郵: hrec@eduhk.hk; 地址: 香港教育大學研究與發展事務處)。

謝謝閣下參與是次研究。

何振聲先生
首席研究員