Chapter 7
A Knowledge Management Model for School Development

Abstract This chapter introduces a normative knowledge management model to support strategic planning by bridging the knowledge gaps for school development. School strategic planning can help school leaders to tackle the impacts and change generated from the schools' external environment. It articulates the relationship between knowledge management and strategic planning and addresses the implementation issues for applying knowledge management in schools.

7.1 Strategic Planning

Strategic planning helps schools to survive in a turbulent policy environment by coping with the changes generated by government policies and market forces as mentioned in Chap. 1. It plays an important role in providing a blueprint for school leaders and teachers to address curriculum reform and lifelong learning policy. Strategic planning can also facilitate the sustainable development of schools by scanning the organisational environment and reviewing internal strengths and weaknesses to prioritise action planning. Without effective planning, schools' targets cannot be achieved and the quality of education cannot be improved. This can lead to a high risk of failure for education reforms and, in turn, a waste of government resources. An important research agenda is how to strengthen staff PKM competency for planning and facilitate knowledge sharing within the school to improve strategic planning.

Effective strategic planning can be streamlined by incorporating knowledge management strategies so as to leverage knowledge resources for gaining competitive advantage. Knowledge management is a management strategy that makes use of information and knowledge to enhance organisational performance, management and operation. It aims to support organisations in creating a capable structure which retains, creates and applies knowledge not only for problem solving, but also for sustainable organisational development. Applying knowledge management in schools may help them to improve their planning capabilities.

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Strategic planning is an overarching process that includes strategic thinking, planning, implementation, review (Lumby 2002), monitoring and adjusting to the realities of the external environment (Peterson 1999). This process includes scanning or assessment of the internal and external environmental components of the school organisation, analysing the information and data collected, and formulating a plan to tackle the impact generated by the external environment (Allison and Kaye 2005; Fidler 1998). Through this process, school leaders and teachers can articulate institutional goals and priorities. School strategic planning helps school leaders to coordinate and reorganise different decisions within schools, and deal with an increasingly turbulent environment and the challenges faced by the school (Weindling 1997). Through this planning process, school leaders and participants can articulate institutional goals and priorities. School leaders can analyse the external environment and internal school capacity for prioritising and planning school improvements through strategic planning (James and Phillips 1995; Everard and Morris 1996). Fidler et al. (1996) note that, during the process of strategic planning, schools can realise the impact of the external environment through environmental monitoring and apply the outcomes to planning. By conducting an environmental analysis, schools can better understand their external environment and formulate a corresponding strategic plan to cope with changes. Institutionalising effective strategic planning not only assists school leaders to understand the situations of the internal and external organisational environment of their school, but also supports the coordination of different management tasks for improving the quality of teaching and achieving school objectives (Hodgson and Chuck 2003; Taylor et al. 2008; Ewy 2009).

An effective strategic plan should be comprehensive, wide-ranging and combine various school activities which would then be compiled into a document (Cheng 2011), ensuring that the actions in the plan are well-coordinated. The objectives of the plan should be aligned with the school goals, the actions in the plan should be well-implemented and the outcomes should be assessed and monitored (Fernandez 2011). Strategic planning is related to the school's vision. It envisions the future positioning and creates a plan to achieve the school vision. The criteria for success for each school activity should be aligned with its objectives. Effective strategic planning formulation depends on the collective wisdom of staff and the knowledge-sharing culture. Staff can contribute more to school development if they are familiar with the school situation through involvement in planning (Cheng 2011). The participation in planning is more important than the outcome of planning, not only because it creates a knowledge-sharing culture, but because it also promotes ownership of the plan. Involvement of teachers in the planning process can facilitate knowledge sharing for effective strategic planning.

As Ewy (2009, p. 3) contends, "involvement of competent teachers in the planning process is a key factor in effective strategic planning." Common reasons for the failure of strategic planning are inadequate staff participation in planning and whether access to reliable data and information is available. A possible solution would be to enhance teacher PKM competency and to institutionalise the KM system for data mining and knowledge sharing. Collecting reliable data and information and staff competency in data analysis are essential for effective strategic planning.

As such, reliable data and information for strategic planning can be mined from a KM system (see Chap. 6). KM aims to support organisations in creating a mechanism that measures, stores and uses knowledge. It increases staff problem-solving capabilities and the organisation's ability to make improvements (Sallis and Jones 2002). KM can be conceptualised at both the organisational level and the individual level. KM at the school's organisational level can be seen as an approach that enables teachers within schools to develop a set of policies and practices or processes to collect information and share what they know, leading to action that improves teaching and learning outcomes. Personal knowledge management is individual competency in managing information and knowledge for problem solving and decision making. Both KM and PKM may play roles in supporting strategic planning. As strategic planning is a management process to manage change for school sustainable development, implementing KM to support strategic planning becomes very important.

7.2 KM Enhances Strategic Planning

Cheng (2013) conducted an evaluative study to examine the predictive effect of the critical success factors (CSFs) for KM on effective strategic planning capacity and on improving school performance. A cross-sectional predictive quantitative survey was carried out to collect data from teachers of 10 primary schools and 10 secondary schools who participated in a Quality Education Fund KM project. The subjects of the study were the teachers of the 20 project schools. Each of the participating schools established a KM Committee (KMC) to facilitate school development in daily practices and had conducted KM audits for strategic planning. In each school, the principal (or someone delegated by the principal) and a group of three senior teachers (as KM managers) were members of the KMC. The KM managers were responsible for conducting KM audits and facilitating knowledge sharing to formulate school strategic plans. Professional training programmes and workshops were provided to KM managers and teachers. Each participating school practised at least one to two focused areas from four different performance domains, namely, management and organisation, teaching and learning, student support and school ethos, and student performance (see Fig. 7.1).

Results showed that teachers tended to agree that applying KM in schools can improve strategic planning capacity, management, their teaching competencies, student support and assessment for learning. Knowledge management vision, sharing culture and IT support were identified as predictive factors for strategic planning capacity. The teachers tended to be satisfied with the curriculum design, materials, instruction and activity arrangements of the KM workshop. They tended to agree that applying KM can enhance the school's management efficacy, is useful for analysing data of students' academic performance and performance in other areas and for the school's development as a whole. However, the teachers tended to only slightly agree that KM implementation can help develop their professional skills and optimise student support services.

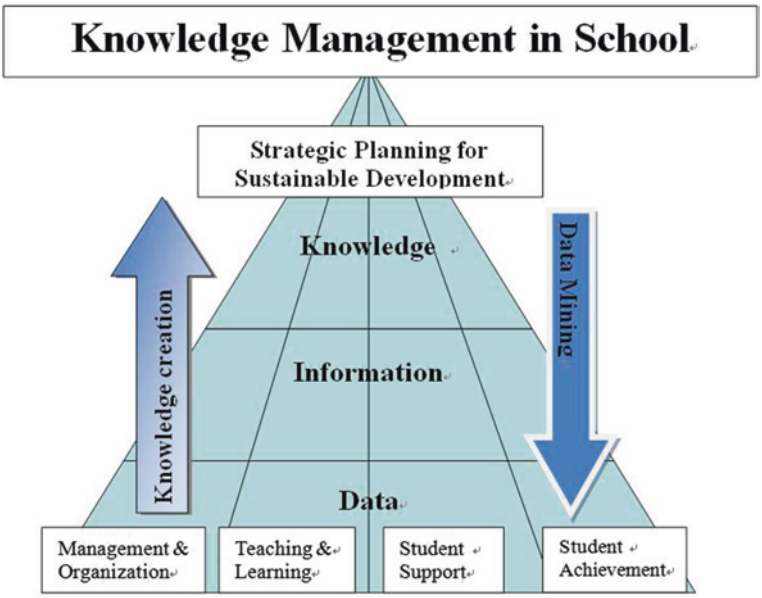

Fig. 7.1 Conceptual diagram for applying KM in schools (Cheng 2013, p. 7)

Four factors were extracted using factor analysis: knowledge-sharing culture, strategic planning, IT support and knowledge management vision. The regression model confirms that KM vision, knowledge-sharing culture and IT support were predictors for enhancing the capacity of strategic planning. The findings of this study support the claims that in order to improve school strategic planning capacity, schools should build a KM vision, cultivate a knowledge-sharing culture and seek resources to develop IT infrastructure.

7.3 How Can KM Contribute to Strategic Planning?

School planning capacity can be enhanced by sharing the KM vision with teachers, cultivating a knowledge-sharing culture by building trust with each other and institutionalising a KM system. KM vision refers to the degree to which the school can become one that creates knowledge and develops teaching and learning by using knowledge management. School management supports the promotion of the idea of knowledge management and shares the vision of knowledge-based development with stakeholders. The sharing culture refers to the degree to which the school is successful in establishing the culture of knowledge sharing and is able to lead colleagues to share their teaching experiences with others. The schools' management can be seen to share their teaching experiences and knowledge regularly, and is capable of leading colleagues to apply knowledge management. They have the leadership

ability to create knowledge sharing and encourage and support teachers to share their knowledge. IT support refers to the degree to which the school's information technology facilities support knowledge sharing. Schools involved have already established collaborative technology to allow knowledge sharing to be conducted through the internet and provide support for teachers to build a virtual learning community.

During the process of knowledge audit and strategic planning, the principal and KM managers of the project schools would consult teachers, ask them for improvement suggestions and develop the plan for teacher collaboration. KM managers would encourage staff to form communities of practice in formulating strategic plans. These CoPs would enhance teachers' understanding of school development and reduce the discrepancy between ideas and action during implementation. This would establish a clear and feasible common goal, and would enable staff to gain a deeper understanding of school values and vision. A culture of trust and collegiality can then be developed. The principal and KM managers allow staff to present their viewpoints through discussion of plans for promoting knowledge sharing among members with an eye to better decision making. Participation by school staff in planning can encourage teachers to conduct regular self-evaluation (Cheng 2008). School organisations may have the best technology and other resources which support KM implementation; however, if teachers are not willing to share their knowledge, that puts the whole KM project at risk. The first step to having a successful KM project is to create a culture of mutual trust, which enables knowledge sharing and which results in organisational learning. Teachers, talents, their skills and knowledge are the ultimate foundations of organisational performance. Eventually, school effectiveness would be achieved by managing the KM system strategically.

The process of formulating KM strategy involves creating a vision and mission, scanning the organisational environment through SWOT and PEST analysis, setting objectives, formulating alternative strategies and choosing particular strategies to pursue the organisation's goals (Ahmad and Idris 2008). Strategies' formulation usually commences with setting the school vision with all the teachers. A bottom-up approach could create a shared vision that bonds teachers together to work in the same direction. However, very few initiatives in an organisation can be successful without the support of the top management. It is the role of the leadership to promote learning and knowledge diffusion amongst the organisation's members as well as to promote the shared vision. When the leadership is committed and supportive, it instills confidence in the employees to be confident in practising something which is completely new to them. Moreover, the shared vision provides a foundation and knowledge-sharing platform to teachers to brainstorm the strategies of the development plans. Therefore, it is not surprising that building a KM vision is related to the school's strategic planning capacity.

The use of information and communication technologies supports the process of formulation of school strategic planning. Effective strategic management, especially under conditions of competition, changing education policy and environmental factors, relies upon data and information. The use of information technologies can enable ready access to data and information and thereby enhance strategic

decision making and strategy implementation. For example, data and information in the four core domains in school education (see Fig. 7.1) can be extracted and transformed into knowledge for strategic planning through data mining. IT infrastructure enables the smooth functioning of various KM processes. KM tools such as data mining help to analyse large quantities of data in the school database and discover hidden knowledge patterns: "KM technology, when given the right source feeds, can deliver relevant and timely knowledge" (Warier 2009, p. 63). The findings provide insight to researchers and KM managers to highlight the importance of information technologies for strategic planning: "These technologies are strongly related to long-term enterprise growth and prosperity, competitive advantages" (Kovacheva 2008, p. 55) and innovation development. They are based on knowledge and help organisations overcome the competition in the knowledge markets.

7.4 How Can KM Improve School Performance?

Knowledge management in school education can be seen as a management system or approach that enables teachers within the school organisation to develop a set of practices or knowledge strategies to collect information and share what they know. This can lead to actions that improve school management, teaching and learning outcomes and student development services (see Sect. 6.1). Applying KM in school settings improves school management, leverages innovative teaching knowledge for enhancing student learning and improves services (see Sect. 6.2). This is mostly done through institutionalisation of a KM system to speed up the problem-solving process through creating or using knowledge to make better decisions and develop innovative ideas for strategic planning. Taxonomy can provide a systematic filing system for effective knowledge retrieval. Ready-made materials can be more easily retrieved from the KM system. Schools should therefore strengthen their knowledge management capacity in order to leverage pedagogical knowledge and maintain a competitive advantage.

The Quality Assurance Division, Education and Manpower Bureau group school performance into four domains, namely: management and organisation, teaching and learning, ethos and support, and students' academic performance (see Fig. 7.1). Cheng's (2013) study showed that applying KM in education would improve school performance. In the management and organisation domain, KM can contribute to knowledge dissemination and to the organisational communication system (King and Newmann 2001). It therefore provides schools with adequate communication channels for teachers to discuss school issues with management. Teachers can reflect on and review feedback from others and develop further strategies for improving management and teaching effectiveness. School policies can be adjusted in light of teacher feedback for maximising student learning. With the building of a knowledge repository for student affairs services, KM provides a one-stop service to teachers and students to achieve information on student study advancement and career guidance, and teachers can be better equipped to provide student guidance and counselling services. KM also helps to capture

and retain experienced teachers' knowledge within the school and strengthen the novice teacher's knowledge through knowledge transfer in administrative work and teaching. Thus, this retains the knowledge within the school organisation. As for the teaching and learning domain, KM supports innovative teaching and effective learning. Through conducting data mining in student test scores, teachers can identify students' strengths and weaknesses for effective instructional design. A few communities of practice on lesson study can be cultivated by the KM system for capturing, sharing, storing and creating pedagogical knowledge and pedagogical content knowledge. As a result, teachers' professional development can be enhanced (Cheng 2009). In the school culture domain, KM not only provides a means for teachers to discuss different ideas about teaching and posting resources for student learning, but also retains the expertise of experienced teachers, increases their effectiveness in terms of teaching and learning performance, supports the development of the knowledge community in the school, and fosters the culture of learning (Leung 2010). KM can strengthen the knowledge-sharing culture and build collegiality into the school organisation.

7.5 Towards a Normative Model for KM Initiative and Implementation

This book may provide an increased appreciation for a broader view of applying KM in school education in Chaps. 1 and 2, developing an organisational learning culture in Chap. 3, cultivating CoPs in schools in Chap. 4, enhancing teachers' PKM competencies in Chap. 5, institutionalising a KM system in Chap. 6 and implementing the KM initiative for strategic planning in this chapter. All these elements constitute a knowledge base for the KM initiative and critical building blocks for KM implementation. Many knowledge problems occur because schools neglect one or more of these building blocks and thus interrupt the KM implementation. Therefore a normative model that guides the design of KM initiatives and sustainable strategies for KM implementation is proposed in this section. The model recommends school leaders to consider knowledge leadership, KM vision, a knowledge-sharing culture, KM in the school structure, and KM strategies as critical success factors in initiating KM implementation. All of these elements need to operate in a mutually supportive way for the knowledge to be leveraged such that the likelihood of effective implementation of KM in schools would be greatly increased.

7.5.1 Knowledge Leadership

Leadership style has a very considerable effect on the attitudes and behaviours of staff towards innovation. Even where schools have clear, uniform KM policies, the way these are enacted by school leaders differs considerably and such differences are significant. School leaders can be vital in making policies meaningful

or, conversely, virtually meaningless. Their underlying attitude towards innovation should be positive, celebratory, encouraging and radical (Storey and Salaman 2004). They should also have ideas for, and experiences of, innovation; as well as knowledge of theories of innovation. For effective institutionalisation of a KM system and implementation of KM processes in schools, the support of the principal and engagement of middle management are essential. Therefore, legitimising KM in the school structure by setting up a KM committee in the school structure and strengthening the leadership role of KM managers to the middle management is critical. The school organisational structure should be as flat as possible to devolve knowledge, power and decision making of teachers closer to students. A flat organisational structure draws upon the core competence of each teacher to enable knowledge transfer.

7.5.2 Building KM Vision

School leaders must have a personal vision regarding how KM practices can sustain school development before working with teachers to develop a shared vision for the entire school (Owens 2004). The essence of building a KM vision among teachers is to create an ongoing process that aims to inculcate a sense of commitment in the whole school, and a desire to apply KM. The KM vision must not be created solely by school leaders or imposed on teachers in a top-down manner. Rather, the vision must be created by means of a comprehensive interaction among the teachers in the school and through challenging and ongoing dialogue. The teachers as frontline knowledge workers should also be informed of KM practices and how KM can be of benefit to their teaching and improve student learning. For effective KM implementation in the school, it is vital to make sure that each teacher "shares a common understanding of KM's basic concepts" (Tryon 2012, p. 77). This can be done by documenting the reasons why the school is pursuing a KM implementation and helping teachers understand the difference between, and significance of both, explicit and tacit knowledge. A successful KM implementation may require significant behavioural change. Resistance to "sharing individual knowledge or reusing existing knowledge" is one of the most critical concerns accompanying KM implementation (Tryon 2012, p. 77).

7.5.3 Knowledge-Sharing Culture

School culture is important in shaping the way in which and the extent to which a school is able to utilise knowledge and deliver innovation with regard to teaching and learning (see Sect. 3.1). The practices of Senge's (1990) five disciplines of organisational learning and Kotter's model for cultural change may help school leaders to cultivate a collective learning culture. School leaders should promote

trust in their schools by first fostering trust between themselves and their teachers. A culture of trust and a platform for knowledge sharing must be cultivated and built. Effective knowledge sharing requires mutual trust among people (Politis 2003; Panteli and Sockalingam 2005). Teachers require the existence of trust in order to respond openly and share their knowledge (Gruenfeld et al. 1996). When there is a higher level of trust, people are more likely to share knowledge (Zand 1972; Andrews and Delahay 2000) and more willing to absorb knowledge (Mayer et al. 1995).

7.5.4 A Normative Model for Guiding KM Strategies

A normative model is necessary to guide the implementation of a sustainable strategy for KM. School leaders are called to answer two fundamental questions on what to manage and how to manage before KM implementation. The first question is what domains of knowledge will be required to support the school development. The second question is how to manage such domains of knowledge so that school leaders and teachers know how to support the school development. Knowledge management is part of the process of the strategic management that makes use of knowledge as a resource to facilitate organisational development. The knowledge to be leveraged and the KM strategies to be formulated should be aligned with the aims of the development plans.

To answer the first question, school leaders should identify the knowledge domains that are critical to the school development plans. For example, if the school planned on developing students' self-regulated abilities and/or enhancing student achievement by conducting assessment for learning, how to develop a self-regulated learner (see Sect. 1.2.2) and how to conduct data analysis (see Chap. 6) would be the domains of knowledge to be managed. A knowledge audit to identify the knowledge of metacognitive teaching and data mining in their schools would help school leaders to decide the details of the KM implementation plan such as KM strategies and tools adopted and the evaluation methods to bridge the knowledge gaps. They should create and maintain a strategic link between the aims of the school plan and domain of knowledge to be managed.

The development of KM implementation strategies to promote innovation and create knowledge is critical. The choice of knowledge strategy (see Sect. 2.6) depends on the specific organisational context (Blackler 1995). In schools, knowledge is usually shared through person-to-person contact based on dialogue through social networks, including occupational groups and teams, and less on the use of information technology. Teacher communication and knowledge sharing are usually carried out person-to-person rather than by codifying the teaching knowledge into documents and sharing them with colleagues through the school intranet. However, teachers do not consider that they can create subject knowledge or pedagogical content knowledge through these interpersonal knowledge-sharing strategies. The process for creation of pedagogical content knowledge at the individual

teacher level not only requires the teachers to retrieve and share knowledge, but also to internalise the knowledge through teaching practice and action learning (Kolb 1984). Similarly, knowledge creation at the organisational level requires the implementation of the knowledge strategies through organisational action learning (Argyris 1993). If schools adopt interpersonal knowledge-sharing strategies, but the teachers have no platforms or resources to conduct action research individually and collaboratively for knowledge internalisation at personal and organisational levels, pedagogical content knowledge cannot be created. Therefore, school leaders should balance the codification strategies and personalisation strategies. This leads to the second question of *how* to manage the knowledge.

In answer to the second question, and to balance the codification strategies and personalisation strategies, school leaders may refer to knowledge conversion activities suggested by Nonaka and Takeuchi's SECI model (see Sect. 2.4). The model indicated four modes of activities that intertwine and transform knowledge: socialisation, externalisation, combination and internalisation. Wu et al. (2013) have conducted a case study of the SECI model on the knowledge transfer and creation process of an educational organisation. They find that knowledge flow can be obtained through the members' mutual interaction and sharing. Further, educational training, conference and workshop systems, and formal or informal social interactions can have a positive influence on knowledge transfer between tutors. The SECI model provides a range of knowledge activities to school leaders for managing knowledge transfer in schools.

Socialisation is the process of transforming individual tacit knowledge into group tacit knowledge. This process represents informal learning that takes place beyond the activities planned, for example teachers' exchange of observations and reflections on the teaching process, exchange of experience and informal experience sharing, and the open-house activities of schools. Therefore, to encourage teachers to share their knowledge and experiences in teaching is the critical success factor for designing socialisation activities. The activities involved in the socialisation process include formal training activities emphasising interactive learning among teachers such as regular study, learning activities, conferences and workshops.

Externalisation is the process of codification of conceptualised or tacit knowledge to explicit knowledge. The activities of knowledge externalisation include presenting the learning experience in a meeting and writing a teaching guide or reports. It is only when the knowledge has been shared and analysed by teachers that such organised highly repetitive knowledge can then be transformed into written materials. School leaders should create a knowledge retention policy to store the extracted explicated knowledge.

Combination is a process to systemise and integrate developed conceptions into the school knowledge system. This process aims to capitalise on the existing knowledge resource for enriching the knowledge of the school KM system. The knowledge activities involved in the combination process include seminars, workshops, secondments and collaborative working on special problem-solving tasks. Through activities for the process of knowledge combination, explicit knowledge

is codified to handbooks or instructional manuals. These documents and manuals are then distributed to all the teachers as the guidelines for the development or modification of teaching materials.

Internalisation is the process of transforming explicit knowledge or concepts into substantial personal experience and practices. This can be a process for teacher learning which takes place in their professional practices and creates tacit knowledge through learning by doing. In this process, teachers have an in-depth learning and understanding of external explicit knowledge and, with the integration of their personal practice experience, they will internalise the knowledge they have learned into the individual mind (Wu et al. 2013).

School leaders should evaluate and measure the impact of the above KM activities for ensuring the alignment of KM implementation with the school development plan and the knowledge transfers for bridging existing knowledge gaps for school development. This evaluation would be continuous and supplement the after-action review to capture the knowledge to improve the above activities (see Sect. 4.7). The successful criteria and approach for collecting data and information to evaluate the effectiveness of the KM should be determined before the KM implementation.

7.6 Summary

The many changes in education and the rapid expansion of knowledge have dramatically influenced how schools perform and the flexibility of teaching. In order to bridge the existing knowledge gaps of nurturing self-regulated learners and conducting effective self-evaluation for sustainable development, schools can strengthen their strategic planning capacity by institutionalising a normative knowledge management model. This can be done through utilising information and knowledge to support the continuing development of professional practice within a global learning environment. School leaders should play their knowledge leadership roles to nurture an organisational learning culture by cultivating different CoPs to support school management, teaching and learning, and school guidance activities. They should institutionalise a KM system and provide learning opportunities for teachers to develop their PKM competencies. They should formulate KM strategies that align with the school strategic plan. The normative KM model emphasises the mapping of knowledge domains with the aims of the school plan and the alignment of KM strategies and the school development strategies. This normative KM model needs to be put into practice to bridge the knowledge gaps and to address problems occurring in school development. The model provides a tangible starting point for a KM initiative and implementation.

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