

Re-examining the Role of Institutes of Education in Science Teachers' Continuing Professional Development: A Singapore Perspective

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Abstract

Continuing professional development for teachers is an important aspect of innovation and progress in any educational system. In this exploratory position paper, we examine the sole teacher education institution in Singapore as it re-examines its role in transforming teacher professional development. We propose a framework which can be used by Singapore's National Institute of Education to support the sustainable and transformative professional development of science teachers. Placing teachers instead of policy changes at the core of professional development, this framework illustrates how teacher-led inquiry and involvement in communities of practice can be integrated to support continuing professional development so as to impact teachers' practices and ensure the sustainability of professional development.

Keywords: institutes of education, continuing professional development, communities of practice

1 Introduction

A study carried out by McKinsey & Company and published by *The Economist* (2007) identified three common features of successful education systems in different countries: (1) successful education systems have excellent teachers; (2) successful education systems get the most out of their teachers; and (3) successful education systems have teachers who intervene to help students who show signs of lagging behind. These findings highlight the importance of ensuring the quality of teachers as professionals in helping education succeed. In this paper, we re-examine and propose a systematic way to reinvent the role of an institute of education to contribute in getting the most out of teachers through engaging them in continuing professional development.

Education is systemic in nature. The central role of teachers for sustaining, reinventing and improving the education system is undeniable. Besides attracting the best people into the education field and providing them with high quality pre-service programs, continuing professional

development plays a considerable role in ensuring currency and quality of education in schools. In recent years, educationists and policy-makers are increasingly recognizing the importance of continuing professional development and paying much more attention to research in this area. Teacher-proof curricula that are aimed at ensuring fidelity of curricular resources have attracted their fair share of criticism and teachers' practices are no longer formulaic (Atkin & Black, 2003). Innovation, change and creativity feature highly in teachers' practices in today's education systems, rendering knowledge that teachers gain during their pre-service training inadequate and outdated within a short span of time. In this position paper, we re-examine the role played by an institute of education in the continuing professional development of teachers and propose a model to illustrate how it can work in partnership with teachers to empower them in their continuing professional development so as to increase the relevance of professional development in their practice.

2 Literature Review

Given the complexities and diversity of continuing professional development for teachers in different cultural and educational contexts, we decided to review two key areas of research literature that are crucial to formulating a new model of continuing education. These areas are the ideas behind continuing professional development, and the professional knowledge of teachers.

2.1 Continuing Professional Development

The scope of continuing professional development is wide. Hassel (1999) defined continuing professional development as the process of improving staff skills and competencies needed to produce outstanding educational results for students. On a larger scale, it refers to *ongoing learning opportunities* available to teachers, and other education personnel, through their schools and districts (Edweek.org, 2006). Hewson (2007, p. 1181) presents four key areas that define teacher professional development: (1) how teachers interact with their students with regard to the curriculum, instruction and assessment; (2)

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teachers as professionals and their beliefs, values and the knowledge which they bear as a professional community of practitioners; (3) teachers themselves as learners who are in control of their working lives; and (4) teachers' epistemologies about science and the natural world. Loucks-Horsley, Love, Stiles, Mundry, and Hewson (2003) view professional development as a process of design, and examine (1) the content of professional development; (2) the strategies used for professional development; (3) the learning context; and (4) the media through which professional development takes place. Hewson gives the teacher the central position in her definition of professional development, while Loucks-Horsley and colleagues emphasize the process of professional development. Regardless of the emphasis, an improvement in teachers' practices appears to be the final goal of teacher professional development.

Given the scope of continuing professional development, different models of continuing professional development are proposed. Kennedy (2005) proposed a spectrum of continuing professional development that spans from a transmission model (training model; award-bearing model; deficit model; and cascade model) to a transitional model (standards-based model; coaching/mentoring model; and community of practice model) to a transformative model (action research model; and transformative model). As we move through the continuum of the three models, there is increasing capacity for professional autonomy of the teachers. Some of the models are a combination of both formal/informal and planned/incidental forms of teacher learning, while others are more homogeneous and consist of only one form of teacher learning.

Education is a dynamic enterprise that is largely shaped by societal and political forces. As such, educational reforms are ongoing and what follows every educational reform is teacher professional development. Information and new developments in education are traditionally passed onto teachers through in-service professional development courses (Kelly & McDiarmid, 2002). Intuitively, this is a popular mode, as it can reach out to many teachers and inform teachers about new pedagogies within a short period of time and with a high fidelity of information. The approach of training through short courses and workshops is efficiency driven, and seems to be suitable for information acquisition and the learning of procedural skills. However, research has shown that this approach is not always effective and rarely leads to changes in classroom practice (Hargreaves & Fullan, 2000). The strong central control of this mode of professional development stems from the need for standardization and could possibly result in a reduction of teacher professionalism and the diversity of experiences of teachers, students and school needs (Kennedy, 2005).

While Kennedy's view may be challenged by those who argue that fidelity and efficiency of educational change are crucial, it remains necessary to keep in mind the adverse consequences pointed out by Kennedy.

Further, it is difficult to establish the cause-and-effect relationship between inputs delivered at a course and subsequent changes in teachers' practices (Nicol & Turner-Bisset, 2006). The justification for taking teachers away from their school and attending an in-service professional development course run by an external agency or curriculum developer is often weak, as there is little evidence of teacher change as a result of attending in-service courses. Despite all the limitations, this form of continuing professional development is still universally recognized and often forms the dominant form of continuing professional development for teachers, because it is recognized as a form of planned and formal continuing professional development that can be officially documented.

Moving along the continuum from the transmission model to the transformative model of teacher professional development, we move into the realm of communities of professional practice. The theoretical framework of communities of practice was proposed by Lave and Wenger (1991), and studied by Wenger (1998), and Wenger, McDermott, and Snyder (2002). A community of practice (CoP) as defined by Wenger (1998) is a group of individuals sharing common ways of doing things, adopting and identifying with somewhat similar identities, and working with similar methods and tools. The key value proposition of a CoP in the professional development of teachers is that it empowers the teachers as agents of sustained self-directed professional development. The formation of CoPs is in contrast to the traditional approach of "training" teachers through short off-site courses or workshops as highlighted above. Participation in a CoP positions teachers to be inquirers into their own practices, and hence empowers them with the agency to change their practices.

Participating in a CoP is different from the traditional model of teacher professional development, as it does not view professional development as an isolated activity, but as an on-going collaborative effort in problem solving and improving practices within the school. These collaborative efforts have direct relevance for the individual and community, since participation within a community brings about ontological changes in learning (Lave & Wenger, 1991) and this degree of learning is directly proportional to the involvement of an individual within the community. Simply put, dynamic and expansive learning communities presuppose dynamic and expansive individuals; dynamic and expansive individuals presuppose dynamic and expansive learning communities (Lee & Roth, 2007). In a

CoP, learning is demand driven and learning is inextricably interwoven with doing -- the notion of practice. Brown, Collins, and Duguid (1989) argue that when a learner is motivated by an authentic demand of a situation, and if learning occurs in the same context, the contextual information may be implicitly or explicitly encoded as part of the knowledge gained. The contextual information is not ancillary to learning, but is an integral part of the knowledge. Decontextualized or defensive learning, which happens in many instances when attending mandatory courses in a training regime, leads to inert knowledge that is not applicable in a real world context; nor is it found to be personally meaningful. In short, participating in a CoP can be seen as an ideal continuous professional development process where: (1) participants are their own agents of learning and expansion of possibilities; (2) learning is demand driven and timely; (3) learning is contextualized and mindful of larger settings or structures; and (4) learning occurs through social collaboration with others at various levels of competency.

Contrary to the popular belief that learning is an acquisition and knowledge is a commodity, we argue for the need to view teacher learning as an on-going process of making sense of current practices and refining the practices as new situations arise (Engestrom, 2001). Moving away from the common understanding that learning consists of placing all the necessary content into the brains of the teachers, what is of value here is to document and understand the complex processes which teachers go through as they learn within the context of the school (as opposed to being taken away from the school), as well as how they can develop professionally by assimilating educational innovations into their teaching practices. Hence, for teacher professional development to occur, teachers need to take center stage for their own learning and not be marginalized as characters with things “done” to them. In this respect, teachers are given more autonomy to transform their practices, and they can do this through individual action research, personal reflection on their practices, contributing to different communities of practice as highlighted above, and mentoring or coaching activities.

2.2 Professional Knowledge of Teachers

In teacher professional development, it is important to note the different kinds of knowledge that teachers need to possess in order to improve their practices. For example, science teachers need to: (1) have current knowledge of the subject matter; (2) have the skills to carry out experiments in the science laboratory; (3) make decisions about the most effective strategies for imparting the subject matter to students (similar to having pedagogical content knowledge); and (4) have a clear understanding of their

students and how they learn best. Further, teachers also need to have knowledge of the science curriculum and its intended outcomes, the assessment modes that students experience, and the norms and expectations of learning within the school system.

This vast amount of knowledge that teachers need to possess for their professional practice is constantly changing; hence, it is essential to keep professional development up to date. Cochran-Smith and Lytle (1999) propose a systematic framework for examining the knowledge that teachers can acquire and be involved in for their professional development within a learning community. They suggest three essential types of knowledge within teacher learning communities: (1) knowledge-for-practice; (2) knowledge-in-practice; and (3) knowledge-of-practice. Knowledge-for-practice describes formal knowledge that is usually generated by university researchers for teachers to use to improve their classroom practices. Within a community of teachers, knowledge-for-practice is likely to include the ability to comprehend the rationale behind choices of strategies chosen and the ability to understand the cognitive demands that are made on different groups of learners. Knowledge-for-practice is theoretically grounded and supported by evidence from research.

Knowledge-in-practice is defined as practical knowledge. Among teachers, knowledge-in-practice describes how teachers make decisions in the classroom and how they go about crafting learning experiences with their students. Decisions made in the classroom include deciding when to move from teaching one concept to another; when to discipline a disruptive child; and how to assess student learning. It describes knowledge of teaching that is accumulated and developed as teachers are exposed to direct classroom interactions. As such, we argue that experienced teachers possess more knowledge-in-practice when compared with a beginning teacher. Knowledge-in-practice, while largely tacit, often directly guides and shapes pedagogical decision making. The importance of knowledge-in-practice in the professional development of a teacher is much diminished if teachers do not have the means and language skills to make this tacit knowledge explicit. As such, systems should exist to harness this form of knowledge for discussion and professional development.

Knowledge-of-practice is the least common type of knowledge among teachers, but it is likely to be the most important and meaningful. Knowledge-of-practice is defined as knowledge that teachers generate from their own practices when they work within inquiry communities to theorize their own practices. As such, this form of knowledge incorporates elements of knowledge-for-practice as well as knowledge-in-practice. To generate knowledge-

of-practice, teachers can work together in teams to reflect upon their practices, collect evidence from their own classrooms, and then make evidence-informed decisions when they are make changes in their teaching.

3 Conceptualizing a Sustainable Model for Continuing Professional Development

3.1 Current Situation

The National Institute of Education (NIE) is the sole teacher education institution in Singapore and works in close partnership with the Singapore Ministry of Education. Teachers at all government and some independent schools must receive teacher certification from the institute before they are allowed to teach. Similar to institutes of education elsewhere in the world, NIE offers comprehensive education programs for pre-service teachers. To complement the pre-service program, an array of in-service courses is offered to practicing teachers. These in-service courses range from one-day workshops, to 30-hour courses which stretch over 10 weeks, to more advanced and long-term courses that can last up to three years. Some of the courses offered lead to formal accreditation such as an advanced diploma or a master's degree in a specific discipline, while others merely award certificates of participation. All practicing teachers in Singapore are entitled to 100 hours of professional development time each year (Ministry of Education, 1999). This is the government's commitment to grooming a quality teaching force for the country. With this privilege, teachers examine their personal development needs, and in consultation with the school decide which courses they will attend each academic year.

The current role which the NIE plays in the continuing professional development of teachers works predominantly on a training model and largely fulfills the purpose of transmitting new subject matter and communicating changes in curricular reforms. The Ministry of Education identifies the training needs of teachers and suggestions are made to the NIE for in-service courses to be offered. For example, in the latest curriculum reforms in science, inquiry-based science learning (Curriculum, Planning and Development Division [CPDD], 2007) is being emphasized. As such, upon request by the Ministry of Education, an in-service course on using inquiry-based methods in science teaching and learning was developed and offered to interested teachers. This method of initiating change in teachers is efficient; systematic; adheres to the original intention of curriculum reforms; reaches out to many teachers in the shortest possible amount of time; and allows teachers to track their own training. However, this method has its limitations. Research carried out in schools

after the curriculum review found tensions and conflicts about teachers' ideas with regard to what constitutes science as inquiry (Kim, Tan, & Talaue, in press; Tan & Wong, 2012). Further, teacher autonomy, the impact of a course on school practices, and the transformation of teachers' practices are issues that are not addressed when courses are developed and taught. This popular training model requires materials to be transmitted from an "expert" (usually a faculty member at NIE) to the teachers, and this seemingly downgraded the teacher's role to that of passive learner (Kennedy, 2005). The standardized curriculum offered by these in-service courses failed to take into consideration the needs of individual teachers and the varied contexts in which they teach. Teachers' knowledge (tacit knowledge-in-practice) is usually not given a privileged position in these courses.

Until recently, in-service courses have been the predominant mode of professional development for teachers, and the NIE contributed by offering expert knowledge in the form of formal knowledge-for-practice to teachers. Learning circles and communities of practice have been introduced in many schools, but have not gained popularity and recognition similar to that of in-service courses. We hypothesize that the lack of systematic tracking and a means to measure the tangible outcomes of learning circles and communities of practices make them less attractive, both for the teachers as well as for policy makers. This is also a problem reported by Fraser, Kennedy, Reid, and McKinney (2007), who found that the lack of sustainability of these modes of professional development and the lack of knowledge of how these forms of professional development should work result in reduced adoption of this forms of professional development.

In an effort to help teachers move towards more reflective and evidence-informed practices, action research was formally introduced to 40 schools in Singapore in 2007 as a pilot project. The partnership between schools and the NIE in ongoing action research is being negotiated and investigated. In such a partnership across two different institutions, the issues of accountability, sustainability, knowledge ownership and logistical issues need to be addressed before a sustainable and collegiate working partnership can be established. Currently, the role that the NIE plays in supporting teachers to carry out action research in schools is to provide advice to the schools on the process of action research. As such, schools offer ideas from their practice perspective, while the NIE provides the theoretical domain. It is not evident how the theory helps to improve the practice or gets understood and assimilated by teachers. Similarly, there is little indication as to how researchers from the NIE use the practical knowledge offered by teachers to refine or theorize their practices.

Preliminary reports of action research in schools have shown that teachers welcome this form of professional development but more systematic planning needs to be done to ensure that such a partnership will be beneficial to all the parties involved.

Figure 1 summarizes the roles and power of the three parties typically involved in the professional development of teachers. At a glance, it appears that teachers in schools are recipients of policy changes and professional development courses from different institutions. The voices of teachers with regard to professional development are relatively quiet when compared with the Ministry of Education and the NIE. This raises the issue of increasing teacher agency in matters relating to their professional development. A partnership between the NIE and teachers can be established to enable teachers to systematically analyze and capture their valuable knowledge-in-practice and transform it into knowledge-of-practice so that they can progressively talk about and improve their practices in a methodical and critical manner. In the next section, we propose a framework for forging partnerships between teachers and the NIE, a framework which places the teacher (rather than the program) at the core of professional development activities.

3.2 Proposed Partnership for Professional Development

In this section, we explore the possibility of positioning the teacher at the heart of professional development between schools and the NIE. We argue that this will

enable teachers' ideas to be better understood and fulfilling teachers' needs have direct impact on the success of any educational programs. All educational change requires teachers to understand the change, negotiate the change in light of their personal experiences and practices and to change their practices to meet the requirements of the educational change (Lefstein, 2008). As such, we argue for a professional development pathway that aims to understand the current teachers' knowledge-in-practice and have it as the starting point for change. The essential feature for such a model is the participation of teachers as partners in the change process, rather than the teachers merely playing the role of implementers in the change process. As partners in innovation, teachers will engage in dialogue with educators from the NIE, creating a space for teachers' knowledge-in-practice to be amalgamated with educators' knowledge-for-practice. We hypothesize that this is likely to create knowledge-of-practice that is meaningful to both teachers as well as educators. Such a model is likely to succeed, since it creates a space for teachers' existing knowledge as a springboard for improving practice. Teachers hence become agents for changing their own practices.

In this section, we illustrate the possibility of such a framework using science education reform as an example. The Singapore science education curriculum underwent a curricular review in 2008, resulting in renewed emphasis on science as inquiry (CPDD, 2007). For teachers to change their ways of teaching science from one that is largely teacher-centric in nature to one which is more process- and

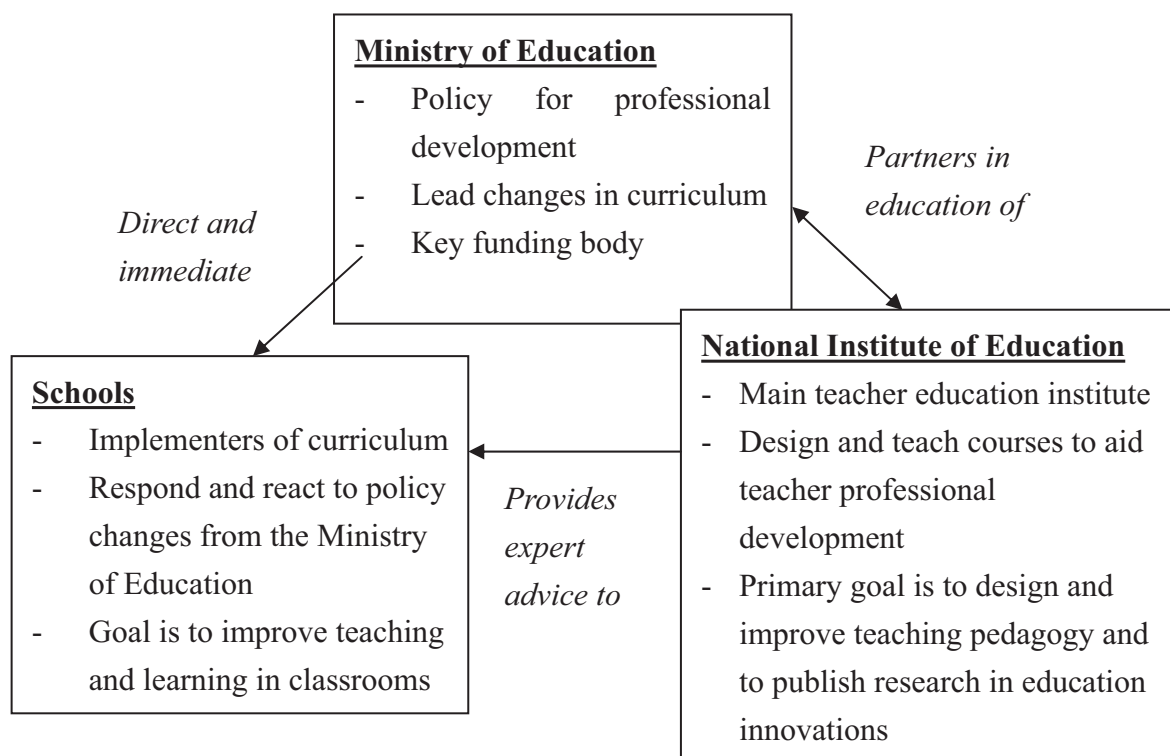


Figure 1 Current Tripartite Relationship for Teacher Professional Development in Singapore

student-centric requires both a change of mindset as well as professional development. Teachers report difficulties in understanding how science as inquiry looks like in the classroom and the types of student-teacher interaction that will constitute science as inquiry (Kim et al., in press). Their existing knowledge-in-practice of science teaching is one where teachers maintain tight control over the content as well as the pace at which learning takes place. This is done largely to ensure that they fulfill their institutional responsibilities in ensuring that students are well prepared for national placement examinations. However, the knowledge-for-practice provided by educators from the NIE and the new science curriculum encourage teachers to facilitate (rather than transmit) science learning in the inquiry process and to give students opportunities to explore science and be exposed to communication and argumentation in science. There exist some tensions between the knowledge-for-practice as advocated by science educators and policy makers and the teachers' knowledge-in-practice. As such, even though science teachers attended the professional development courses offered by the NIE and Ministry of Education (MOE), the implementation of science as inquiry in the classroom remains varied (Kim et al., in press). We argue that the limitations of these in-service professional development courses lie in the fact that their objective is one of mass communication of reform ideas (largely knowledge-for-practice) and that teachers knowledge-in-practice is usually not taken into consideration. As such, teachers find it difficult to reconcile their existing practices with those which the new reforms advocate.

In an earlier study carried out with 25 science teachers in Singapore, it was found that teachers view the formation and being involved in learning groups as impactful on their teaching, although they express less accessibility to a learning group as compared with in-service courses (Tan, 2008). Building on this information and also on the current difficulties faced by teachers in the implementation of science as inquiry, we propose a professional development framework that disperses the dominant power relationship between the parties involved in professional development (as highlighted in Figure 1). Instead, teachers are partners in the change process and there is an interdependent relationship between the NIE and teachers such that the professional development of teachers is a result of collaboration between NIE educators and teachers. This collaboration involves NIE educators bringing their expertise of knowledge-for-practice (such as characteristics of science as practice as described in curricular documents, frameworks for developing students' skills in science argumentations, etc.) in science education and dialoguing with teachers about the meaning and usefulness of

these ideas. Teachers will then try to understand their knowledge-in-practice from the lenses of the theoretical ideas presented, and then critique areas of limitations. The NIE educators and teachers will also form a community to collect evidence and explore ways of improving science practices in the classroom. Figure 2 summarizes the proposed model of professional development for science teachers.

The three key modifications suggested here are: (1) enhancing in-service courses to ignite change; (2) providing a platform for dialogue and sharing of different forms of knowledge; and (3) the formation of CoPs to share expertise to facilitate teacher-led inquiry. The triangles are the key players in the professional development process; the circles indicate the activities; and the squares reflect the outcomes or state of being after each professional development activity. In the next three paragraphs we describe how each of these modifications is useful in enhancing teacher professional development.

3.3 Enhancing In-service Courses

While we recognize the limitations of the traditional transmission model of professional development through in-service courses, we also recognize the potential that it has in infusing expert knowledge in science and science pedagogies into the practitioner community. Here we propose that in-service courses that are conducted by the NIE can serve as a starting point for new ideas and for the formation of communities of practice. For example, when primary science teachers attend an in-service course on inquiry based science teaching, instead of each teacher going back to their respective schools and engaging in isolated practice when the course ends, the course instructors from the NIE can facilitate the formation of these communities of practice by following up, over a fixed period of time, how teachers integrate the ideas that they have learned. Alternatively, an on-line discussion forum can be set up where teachers in the course can share their experiences of implementing the ideas from the course. Face-to-face sharing sessions can also be organized as part of the course, months after the course, for teachers to share how their practices have changed and new insights that they have obtained. As such, the in-service courses serves as a primer not only to transmit new content, policies, and ideas, but also as a means to allow teachers to meet like-minded individuals and to assimilate what they have learned in the courses into their own practices. The NIE can provide the expertise to conduct the courses, and also facilitate discussions, sharing sessions and even on-line forums. In this way, the in-service course serves as the first point for "renegotiation of professional meaning" (Fraser et al., 2007, p. 166).

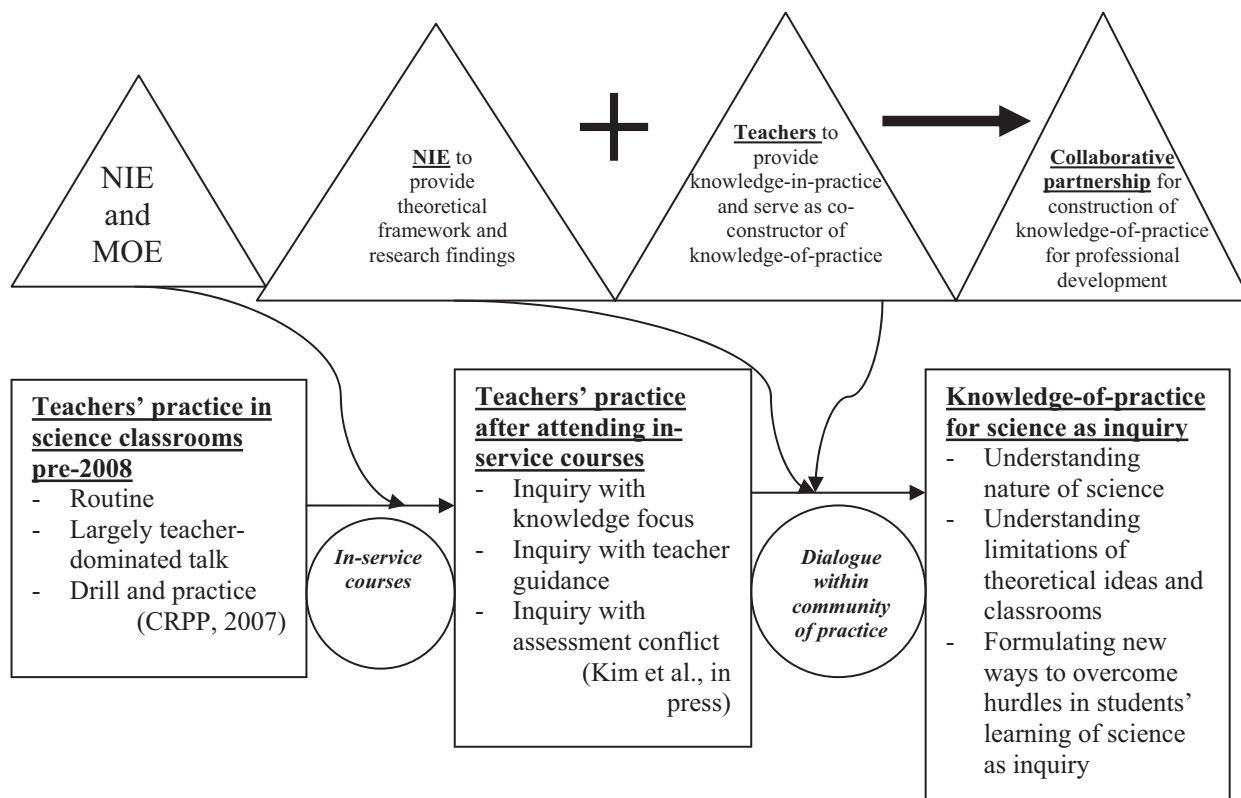


Figure 2 Proposed Framework and Roles for Sustainable Professional Development

3.4 Primer for the Formation of Communities of Practice

As described above, while providing in-service courses, the NIE, can serve as an incubator for new ideas within communities of teachers who share common practices. The formation of communities of practice that stems from common experiences allows for self-directed learning that can be seen as a continuity and coherence of what the teachers have learnt in the in-service course, as highlighted by Wenger (1998). The teachers can form themselves into a group of individuals sharing common ways of doing things and working with similar methods and tools. The formation of these learning communities should originate from within the practitioner, rather than being initiated from an expert outside the community. This would ensure sustainability of the efforts (see Loughran & Gunstone, 1997).

As individuals, teachers also belong to different communities of practice, hence cross fertilization of ideas becomes possible. Besides gaining ideas and developing in their professional practice, the interactions in which teachers are engaged allow the social domain of teacher development to be taken care of. Involvement in communities of practice allows for teachers to develop the discourses (Gee, 2005) that will enable them to identify what is acceptable within the community. The role of the NIE in this is to provide the platform for the formation of these communities of practice so that they can further develop into self-sustaining communities.

3.5 Sharing Expertise for Teacher-Led Inquiry

Teacher-led inquiry takes the form of action research or lesson studies and is a means to make professional development more transformative in nature (Kennedy, 2005); it also gives teachers' knowledge-in-practice a privileged position. However, teacher-led inquiry based completely on practitioners' knowledge has its limitations. As such, as can be seen in Figure 2, we propose that the learning space for teacher-led inquiry needs to take place within a community of practice where different areas of expertise and kinds of knowledge exist. The expertise to facilitate teacher-led inquiry can come from both the teachers as well as experts from the NIE. In this way, a dialectical relationship between practitioners' knowledge and theoretical knowledge exist, and this can enhance the sense-making and innovation process in science education for both practitioners and researchers alike.

In-service courses can also present ideas for teacher-led inquiry into different science-teaching pedagogies. For example, if a teacher, after attending the inquiry-based in-service course on science teaching, decides to examine the impact of the strategy of "predict-observe-explain" (POE) on her students, she can collaboratively design a study with the researcher from the NIE. Data collection and data analysis can be done in consultation with the NIE and findings can be discussed with other teachers who are working on similar strategies through participation in the community of practice.

4 Concluding Remarks

Continuing professional development in any domain is an expensive and complex enterprise. While the teachers' professional development role is often justified as instrumental for educational reforms and its potential is bountiful, it is necessary to cast a critical eye to examine the roles each of the different parties involved in professional development play in ensuring the coherence and relevance of science teachers' professional development. The proposed framework for the role of the NIE as a teacher education institution is not without concerns. There are areas which need to be addressed, either through research or policy change, to ensure the successful implementation of the proposed framework. Honig (2006) pointed out that administrators need to ensure that planning and implementation of new policies and initiatives are examined, and that issues like people, places and policies need to be carefully considered. In presenting this proposed framework for the role which the NIE will play in the continuing professional development of science teachers, several issues need to be addressed. These issues include: (1) sufficient manpower (experts) who are hired by the teacher education institution (NIE) but who are actively working with teachers in schools; (2) sufficient experts with authentic experience in schools; (3) balancing the systematic tracking and evaluation of the impact of action research with the obsession of producing an action research report for accountability purposes; (4) the balance between the collective good of the school as opposed the individual teachers' aspirations in participating in continuing professional development; (5) sufficient time and cost for extensive and prolonged professional development; and (6) formal accreditation for teachers. Unique to science education would also be the concern of how scientists who have little or no pedagogical training communicate their knowledge to teachers and distill their knowledge into a form which is suitable for school science.

The purpose of this paper is to present a proposed framework on how the sole teacher education institution in Singapore can contribute to continuing professional development of science teachers. As illustrated above, continuing professional development is a complex issue which includes different parties with different agendas. While there are different models of continuing professional development, we have presented here a model designed to work in a context of strong central control, but one which also encourages individual innovations in professional development. Though this proposed model has yet to be tested, the ideas presented in this paper could perhaps stimulate conversations between researchers working on university-school partnerships and teacher education

practitioners as they embark on reinventing themselves for the 21st century. The ideas presented in this paper can also serve as an agenda for further research in the area of continuing teacher education.

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