This is a phenomenographic study of the different ways that teachers understand their purposes of using teacher networks. My experience in operating this kind of networks finds that in spite of frequent downloading of teaching materials, few teachers make contribution back to these networks, neither do they take active participation in the forums on the networks. To look into this phenomenon, I have chosen to investigate the more basic question of why teachers in the first place go about using teacher networks. Ten teachers from diversely different schools were interviewed in a naturalistic setting. The interview data were then analyzed using a phenomenographic approach, which results in a set of five categories of purposes of using the networks, namely, (i) saving time for convenience, (ii) finding supplementary resources, (iii) finding ways to complete new tasks, (iv) reaching out of existing isolation and (v) exploring for personal development. It is found that a teacher usually mentions
several of these purposes, forming a continuum with one pole orienting towards finding resource and the other towards development and learning. Deeper understanding of the teachers has been gained, which can be used to provide evidence for reasoning about possible strategies for running a teacher network. More importantly, this study furthers to illustrate a difference in how the use of the networks means to teachers. This sheds light on teacher training, revealing the possible options which teachers should be aware of and use at their disposals. To further illuminate this phenomenon of technology application, more studies of this sort are absolutely needed.
Studying Teachers' Sense of Purpose of Using Teacher Resource Networks and Its Implication on Network Development

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1 This thesis is downloadable from http://www.hkucs.org/~hclam
Declaration

I hereby declare that this dissertation represents my own work and that it has not been previously submitted to this University or any other institution in application for admission to a degree, diploma or other qualifications.

Signed:

(Lam, Ho Cheong 林浩昌)
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CHAPTER 1

INTRODUCTION

Context. In recent years, the use of educational networks to support daily teaching practice of teachers and to foster teachers’ professional development has blossomed in all parts of the world including England, Taiwan, Singapore, Mainland China and Hong Kong as well (See appendix I). The kinds of service that are commonly provided on these teacher networks are as follows.

♦ A repository of teaching materials for teachers to download, including examination questions, task sheets and web links.
♦ Conference forums, where teachers can converse with the teachers in other schools, sharing problems and their school experience.
♦ Case studies of innovative instructional designs, for example, good practices of using information technology in teaching.
♦ Information about upcoming events such as seminars, workshops and other teacher training programs.

Background and Issue. Since 1998, I have been managing the development of one of these teacher networks - the CMI network, which supports teachers using Chinese as the Medium of Instruction. What I found in my experience is that the network is indeed a very convenient and effective way of disseminating the teaching materials that we collected from schools to a large number of teachers within a short period of time. In this sense, the network is successful but, on the other side, those teachers using the network seldom make contribution back to the network. For example, the
downloading of examination questions from the network is well utilized, especially
during the seasonal period when teachers are extremely busy setting school
examination papers. But conversely, over the period of operating the network for
almost three years, only a few teachers have taken the initiative to submit a web link
to the network even though we provide them such a mechanism for them to share with
each other web links useful to their teaching.

As another example, this problem can also be seen in the interaction of teachers
in the conversation forum on the network. Simply put, I can summarize the discourse
of the discussion in this pattern: (i) a teacher raises a question; (ii) our center suggests
a probable explanation; and (iii) the teacher acknowledges the center, which ends the
conversation. Other teachers silently observe the conversation goes, seldom
participate and bring up their viewpoints and opinions in the discussion. Thus it is
hard to encourage collaboration among the teachers to help each other. Let alone
raising the quality of teaching together. The center has restrictively become the only
source of knowledge to foster the growth of the whole community.

Putting these together, I come to the point that teacher networks have only
reached a one way production-and-consumption model of a community rather than a
platform or a sounding board facilitating and fostering learning among teachers as a
whole. As a matter of fact, with stringent resource, most of the networks can only
provide limited support to such a large number of teachers. As such, teacher
participation is of utmost importance in order to bring about a rapid and exponential
growth in the quantity and quality of the content on the networks. Because of this, we
have administered questionnaires to the schools to make sure that the kinds of service
that we provide on the network indeed meet the need of teachers.
Questionnaires have been sent to a random one third of our membership schools to investigate two questions: (i) What are the kinds of problems that the teachers expect our network to solve for them? (ii) What are the kinds of service that our network should provide? The result of the questionnaires confirms that our network has been suitably directed towards serving the teachers with what they need. Further to this, it also indicates an inclination of the teachers towards demanding us to provide more resource. However, little is said deeply about this apparently “resource only” belief of teachers.

Considering this, I began to think about studying the more basic question of why teachers use teacher networks? Do they consider the networks as something only for getting free resource? Do they know why, and for what purposes that they have to interact with the teachers in other schools? Would they regard the networks as a chance to foster a growth of communal knowledge among all teachers as a whole? As someone implementing the network, I often simply assume the network is good to the teachers, so I always push them to use it. But if the teachers do not believe in the same way, they will never use it, or just use it according to what they believe.

Prior to this study, I know from informal conversation with the teachers that there are teachers who believe that the larger quantity of the resources that we provide, the better will be the network. These teachers are the ones who consider the networks

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2 Apparently this causes problem to the appropriateness of my approach in this study because phenomenography is seldom used to study the question “why” of a phenomenon. However, notice the difference between the “why” here, which is the reason of the teachers of using the networks, and the seldom studied “why” of the
as “free resource” providers. But, as contrast to this, there are also teachers who believe that the teaching materials are not directly applicable to them because the teaching materials may not exactly meet the ability of their students. Hence the teachers will just look for high quality samples, a few of which will be enough to inspire their thinking since they have to make their own teaching materials anyway. The quantity of the resource is thus not important. But this contradicts with the way of thinking of the previous resource-seeking teachers. It is exactly these apparently paradoxical viewpoints of the same phenomenon of teacher networks that have sparked my great interest in doing this research study.

Research Questions. What are the different ways that teachers experience the purposes of using teacher networks? How do teachers make sense of their use of the networks?

The Significance. The major contribution of this thesis lies in providing a deeper understanding of how teachers make sense of their experience in using teacher networks by means of a full description of the variation in the different categories of purposes of teachers of using the networks. The findings of this study can pragmatically and practically provide evidences from the perspective of teachers for reasoning about possible strategies and models for effectively running a teacher network. More academically and intellectually, the insight gained in the deep understanding of teachers can also throw light on how teachers actually go about using the technology in their practice of teaching. Further to this, the present study forms a basis for further research on the meaning of technology in general.
CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Though a large number of teacher networks have been established within these few years, there is still little substantial research rigorously theorizing the experience on explicitly how to run a network to facilitate educational changes. In what follows, I will draw on other research studies, which might probably bear some impact on the present problem, across the fields of Computer-mediated Communication (CMC), Virtual Community, Educational Networks, Learning Community and Philosophy of Technology.

Rather than reciting the works of these studies in a descriptive way, I will instead highlight some of the recurrent themes or issues that have been repeatedly addressed from these studies. In reviewing these research traditions, I have kept asking myself the following questions: (i) How do these studies characterize the interaction among the different groups of people on the networks? (ii) What possible factors are in effect giving rise to such an interaction among the groups of people? (iii) What are the significance and implications of these studies upon my present study on teacher networks? This section will be ended with the contrast of the difference between the phenomenographic approach, which I have adopted in the present study, and the other perspectives in research undertakings.

The following is the major issues, which have been repeatedly discussed in the literature. I will elaborate on them one by one in the subsequent sections.
Evening Out the Participation and Empowering the Authority

Place and Time Independence and Ease of Access

Informal Structure and Common Interest

Active Participation and Real External Context

Breaking Isolation and Teachers’ Knowledge Building

Technology as a Phenomenon

Evening Out the Participation and Empowering the Authority

Using a medium deterministic approach, early study of Kiesler, Siegel & McGuire (1984) explores the characteristics of people participating in the conversation in CMC systems. Since non-verbal social influence cues were absent in the conversation, it became difficult for people to exert the usual form of discussion control. As a result, not only aggressive participants can no longer dominate the whole conversation, but also people in minority can voice out their opinions to the others, thereby giving everyone an identical chance to participate. Other researchers (Schuler, 1994) extend on this equality property of CMC and claim the potential of technology in achieving “electronic democracy”. However, the findings of other later studies are not totally supportive to this, instead showing a strengthening of the power of those participants in authority.

Tsui & Ki (1996) analyzed the interaction of the participants on their teacher education network for English language teachers. It was found that the response patterns tend to be bilateral, only from the teachers to the teacher educators, or vice versa, but not among the fellow teachers themselves. Tsui & Ki ascribed the reason to
the teachers’ perception of an authority or expert of the teacher educators. In a way, the authority still takes the lead in the conversation. To the teachers, as non-native speaking English teachers, they unavoidably have to worry about the manifestation of their incompetence when making grammatical mistakes or asking questions about the English language. Some of the teachers even mentioned that they have to check the dictionary before sending any message (Tsui, 1995). As such, the teachers are still not at a position of directing the conversation.

Even though CMC tends to even out the participation, it also makes the appearance of those in authority stand out. Rheingold (1993) nicely puts together this paradoxical situation into a contrast between the Electronic Agoras and the Panopticon. Agoras (Mitchell, 1995, pp. 6-24) were ancient Athens marketplace, where the citizen met to happily talk, gossip and debate about political ideas whilst the Panopticon (Bowers, 1988, pp. 14-19) on the contrary is the ultimately effective prison, where a single guard can keep all prisoners under close surveillance at all times. Whether computer conferencing would result in the Agoras or the Panopticon is still not yet concluded.

**Place and Time Independence and Ease of Access**

Arguing from a communicative perspective, Rice (1989) points out the main specialty and potential of CMC as its freedom from constraints. By this it meant that the receivers in the communication have the ability to select the medium and the content, to use the medium at any time and at any location and to reprocess any part of the content. Because of similar line of reasoning, Jones (1995) concludes that the flexibility of CMC can allow us to desirably customize our social contacts from
fragmented communities that we want to visit and stay in. Drawing this to the educational context, Harasim (1990) sees the implication of place independence of computer conferencing as expanding the diversity of students’ access to collaborate intellectually with experts and the peers regardless of location. Time independence also makes it possible to conduct a “24-hour classroom”, which can be extended for as long as required to cover all the materials in a more meaningful and complete way. However, these arguments seem to assume that there are plenty of computers available everywhere.

Several of Riel’s studies (Riel, 1989; Riel & Levin, 1990) on educational networks examine the participant structure and the social organization of the participants in influencing the group interaction. It was found that ease of access with the presence of computers distributed to every office, as compared with placing all the computers at an adjoining office that requires users to visit, is crucial to the final success of the operation of an education network. Besides this, the previously mentioned advantages of place and time independence also seem to assume that all users are competent and proficient in computer skills, which Tsui (1995) has however shown to be decisive to the success of teacher education networks.

Informal Structure and Common Interest

One widely cited literature for describing the characteristics of online community is the sociological study of Oldenburg (1989) about informal gather places such as sidewalk café or beauty parlors, which is named as “third places” after home, first and workplace, second. Third places are characterized as follows.
“Third places exist on neutral ground and serve to level their guests to a condition of social equality. Within these places, conversation is the primary activity and the major vehicle for the display and appreciation of human personality and individuality. Third places are taken for granted and most have a low profile. Since the formal institutions of society make stronger claims on the individual, third places are normally open in the off hours, as well as at other times. The character of a third place is determined most of all by its regular clientele and is marked by a playful mood, which contrasts with people’s more serious involvement in other spheres. Though a radically different kind of setting from the home, the third place is remarkably similar to a good home in the psychological comfort and support that it extends.” (Oldenburg, 1989, p. 42)

The above description of third places obviously resembles in many ways the conversation taken place in online conferencing. In accordance with this, Feenberg & Bellman (1990) also point out one of the social factors leading to strong social bonding or solidarity of participants to be a lack of clear formal structure in the conversation. Successful academic applications of computer conferencing are also the result of no obvious hierarchy in academe. In light of teacher networks, this informal arrangement however sharply contrasts with the authoritative structure in schools, which should require other kinds of procedures and practices significantly different from those evolved in academe.

Besides this, no formal structure do not mean simply that leaving a community unattended will result in continuous growth and development of the community. Rheingold (1993) writes about the concept of “collective goods”, which states that cooperative group can exist only if most of the members recognize something that they can only gain through being together. Reil (1989) also shares this with many
others (Baym, 1995; Erickson, 1997; Rice, 1989; Wenger, 1998) that, without a shared interest or a common task, users tend to drop out since infrequent access makes the telecommunication an unreliable way of conveying the messages. Other users will worry about their messages are not being read, thereby further discouraging the participation. To sum up, a communal purpose that most members have in common is indicative of the success of a teacher network.

**Active Participation and Real External Context**

Judging from her practical experience in building community on the web, Kim (2000, pp. 155-199) points out the importance of the participants’ active participation in the steering and shaping of the growth of a community. When the participants, rather than the organizer, take a leadership role, it is more likely to identify a direction that agrees with the pressing concern of the majority of the participants in the community. This suggestion is in line with (Bruckman & Resnick, 1995) the application of the “constructionist” principle (Papert, 1993, pp. 137-156) in facilitating professional community of media researchers in the MediaMOO project, where worldwide researchers can build their own part of a virtual world rather than merely interact with a pre-designed environment. Participants in a newsgroup R.A.T.S. were also found to be creative in exploiting the systems’ features so as to play with the new forms of expressive communication. This includes the extensive invention of novel acronyms in the newsgroup (Baym, 1995). Common to all these studies is the active involvement of the members in exploring the value of the community.

Further to this, the goals of the members in the participation are often more than merely constructing the community itself but to aim for far-reaching goals that
connect to the real external context. As reported in the fieldwork of Rheingold as a native informant in the virtual community of WELL, even though the community began on the network, the members at a later stage met each other in person.

“The WELL felt like an authentic community to me from the start because it was grounded in my everyday physical world... By now, I’ve attended real-life WELL marriages, WELL births, and even a WELL funeral.” (Rheingold, 1993, p. 2)

In the case of teacher education networks, Tsui and Ki (1996) also suggest that the English teachers on their network have become more active after they have a chance to meet the involved teacher educators face-to-face.

**Breaking Isolation and Teachers’ Knowledge Building**

The vision of Riel (1998) of the future learning communities as facilitated by the communication technology is a joint collaborative effort among a group of participants from a wide range of expertise, namely, community teacher in assessment, center teachers in humanities and science and learning guides in students’ learning. Riel (1992) further criticizes the traditional teaching of isolating teachers from one another; thus intellectual stimulation that challenges the unexamined assumption of the teachers is rare. Alongside this, Ki & Lai (1996) also point out the particular usefulness of networks for teacher education and professional development as teachers usually work in isolation and seldom have the opportunities to interact with each other as a professional group except during pre- or in-service training.

Besides this, computer conferencing on teacher networks also offer teachers the
convenience to reflect on their teaching during daily practice, which is important to the professional development of teachers as what Eraut (1994, pp. 142-149) writes of Schon about the notion of reflection-in-action. Harasim also suggests the remarkable advantages gained in enhancing this kind of reflective learning using computer conferencing.

“The theoretical framework of collaborative learning suggests that conferences can provide a fertile forum for interaction. Answering requests for clarification or assimilating responses that disagree with earlier statements from the participants can refine one’s own ideas. The interaction necessarily involves formulating arguments or reorganizing material to introduce new (previously unrecognized) relationships, thereby advancing the knowledge of the participants.” (Harasim, 1990, p.45)

Despite the above benefits, the research of DiMauro (1994) on the use of telecommunications for Science teacher leaders however shows that this kind of reflective messages about professional practice rarely occurs naturally except when special attention has been carefully paid to the socio-technical conditions. Research on learning community of students may also have some bearing on how to foster knowledge building in teacher community. Bielaczyc & Collins (1999) abstract from many learning communities several principles leading to collaborative construction of communal knowledge. The principles advocate that all members should have a meta-cognitive understanding of the knowledge boundary of the diverse expertise of the whole community. In the case of teacher networks, a teacher needs not to know everything but he should know who knows it in the community through the use of the network.
Relating to This Study. Many of the above issues can be brought to bear on the present study of teacher networks. Following on this, there are a number of questions that we can ask: Which teachers will see teacher networks more as Agoras, and which more as Panopticon? How will teachers in minority think about the ways to get the most benefit from the networks? Which teachers will explore the new possibilities as enabled by the place and time independence of the networks? What are precisely the different “collective goods” of the teachers using the networks? How will teachers recognize as the potential of the networks in connection to their external context of teaching practice in schools? How will teachers consider the possibility of the networks in helping them to escape from isolation in schools? Will teachers regard collaborative knowledge building as their reasons of using the networks? How will teachers look at reflection in their daily practice of teaching on the networks?

Technology as a Phenomenon

Most of the research approaches mentioned above follow a social psychological tradition, which tries to explain the phenomenon of teacher networks on the basis of what is taking place either within the individual mind or in the social organization of participants, emphasizing mostly on the human aspects. This approach is incomplete in the sense that what is addressed is only limited to the social deterministic factors, neglecting at least the non-neutrality of technology, which operates at the same time on augmenting the human experience.

Several alternative frameworks have been proposed, which differ from the sociological approach in a primarily focus on the relation between people and technology, and in other words, the practice of the participants or the praxis of using
the technology. Phenomenology is one of the philosophies that we are in need of for studying the technology as a phenomenon.

As a pioneering example, Ihde adopts the method of phenomenological analysis to discover the structural features of different patterns of human-technology relations through scrutinizing his own experience (Ihde, 1993, pp. 95-118; 1990, pp. 72-123). Two of the most salient relations are the embodiment relations than technology enhances and amplifies our bodily-perceptual experience of the world and the hermeneutic relations that technology translates observed measurable objects into some more abstract concepts. Another approach with the same underlying philosophy and equal object of research is phenomenography.

Phenomenographic approach, which is the method I use in this study, adopts an empirical orientation to examine the experience of other people, which is usually carried out with the use of interview. As Marton puts it, “From the first-order perspective we aim at describing various aspects of the world and from the second-order perspective [that phenomenography is all about] we aim at describing people’s experience of various aspects of the world.” (Marton, 1981, p. 177)

The idea of phenomenography (Marton, 1981; 1988a; Marton & Booth, 1997) is to find the qualitatively different ways that people experience or think about various phenomena. The method has been extensively used to investigate different conceptions of learning (Marton, Dall’alba & Beaty, 1993; Marton, 1988b). The unit of analysis of phenomenographic research is a way of experiencing something while the overall object of research is to find out the variation in ways of experiencing the phenomena, the results of which are often described as a set of categories of
What makes phenomenography different from the social psychological research undertakings is an emphasis on the central role of content. All of the previously mentioned social perspectives characterize the processes of perceiving of the participants in general, which is supposed to be applicable across other context domains. There is however little said about the particular content involved such as what actually the topics are about in the conversation of the participants on the teacher networks. In contrast, a phenomenographic approach does not assume a general model. Rather, the content-oriented nature of phenomenography situates the study within a certain context, without separating the structure and the content of experience from one another.

As far as I know, there is no research study that has used phenomenography to investigate the specific area of teacher networks. The present phenomenographic study on the teachers’ sense of purposes of using the networks should throw new light on the area from an unconventional perspective, hopefully to reveal the phenomena in a concrete and content-embedded way.
CHAPTER 3

METHOD AND JUSTIFICATION

As mentioned previously, I have adopted in this study a phenomenographic approach to find out the different ways of experiencing the use of teacher networks and in particular how they see the purposes of using the networks. One important thing that I want to clarify is that I was not classifying the interview data according to any pre-determined theoretical framework. Instead, it is the main task of a phenomenographic research enterprise to derive inductively out of the interview data a set of categories of description through vigorous and thorough analysis, rather than fitting the data into existing categories of other researchers. As such, I have chosen to start this study without a definite theory and to prepare my mind to be as open as possible.

In the succeeding sections, I will describe the way that I have carried out the data collection and analysis in this study. Several methodological issues concerning the approach will also be discussed, including the assumptions behind phenomenographic study that I am aware of and so need to make known to other researchers.

Selection of Teachers. Ten teachers were chosen for this study using convenient sampling with nearly no criteria in the selection. Some of the teachers were identified in an earlier survey administered to schools from those who responded with an indication of willing to participate in follow-up interview. While I know the other teachers during school visits to the member schools of our center as introduced by our school coordinators. Again there is no specific selection criteria on the teachers as long as they know what a teacher network is and have used it for some purposes.
All of the interviewed teachers have some experience on using teacher networks, though some of them may use more intensively while the others only occasionally. Most of the teachers teach junior grades, teaching a variety of subjects including Chinese Language, Integrated Science and Economics and Public Administration (See appendix II). The ten teachers came from ten different schools. There is considerable variation in the backgrounds of the schools with students from a fair mix of social-economical status and academic performance.

*Interviews and Questions Asked.* Semi-structured interviews were used as the method of data collection for this study. Most of the teachers were interviewed at their own schools. The interviews were conducted in Cantonese. Each of the interviews lasted for on average forty minutes. After each interview, I carefully transcribed the audio-recorded conversation into verbatim transcripts.

The following questions were consistently brought up to focus the conversation of the teachers to the purpose of using teacher networks.

♦ Do you find any of these teacher networks useful to you? Why?
♦ Could you give me some concrete examples of your experience of using teacher networks? What was the purpose in your mind when you used the networks?
♦ What kinds of things were you usually looking for on these teacher networks?
♦ What do you think is the purpose of participating in the conference on the network?

I often let the teachers begin with the mention of a concrete scenario of how they
actually use a teacher network in their daily practice of teaching in schools, then continued to ask about their purpose of using the network in that particular case. In so doing, the teachers could think with a more complete and contextualized situation, about how teacher networks truly mean to them, with the avoidance of abstract questions about conception.

The interviews were not analyzed until the completion of all of the interviews rather than analyzing each interview right after it. This was an attempt to keep the condition of all interviews the same to ensure that all data should carry equal importance in the final analysis. By so doing, the later interviews would not be conducted with a pre-understanding or prejudice in mind as derived from the interpretation of the earlier interviews. This follows the suggestion or guidelines of the phenomenological reductions as will be described in the later part of this chapter.

Analysis of Data. On the whole the method in this study for analyzing the interview data follows that of Marton (1984) and Säljö (1988). I first read all of the interview transcripts repeatedly several times to familiarize myself with the data. After that, quotes or expressions relevant to my enquiry were interpreted and understood in the context of the overall interview transcript. The quotes were then identified and marked out in the unit of one example or instance of use. The quotes were finally gathered together to make up “a pool of meanings”.

I then shifted the focus from the individual to the meanings embedded in the quotes, disregarding whether the different meanings originated from the same teacher or not. Starting with one quote, the suggested purpose of the teacher from the quote was determined and assigned as one category. Then another second quote was
compared to the first quote, contrasting whether the two quotes indicate the same category of purpose or not. To decide whether two quotes belong to the same category, essential or distinguishing features were identified and used. The details on the distinguishing features of each of the categories will be described in the next chapter.

In this way, quotes from one teacher may contribute to several different categories of meanings; whilst different teachers may express the same meanings in one category.

Methodological Issues

There are several assumptions behind the current approach used in this study, which I must acknowledge and to deal with explicitly. First and foremost, I must admitted that teachers are supposed to use teacher networks with an intention rather than merely serendipitously. Or else, the present study on the purposes of the teachers would not make sense at all. This is the most fundamental assumption of the present study. Other methodological issues will be described below.

A Limited Number of Categories. Like all other phenomenographic research, the present study assumes that there is only a limited number of ways that an individual conceptualizes his purposes of using the networks. In other words, there must be similarities among the conceptualized purposes, which is indeed the reason to find essential features that distinguish a category from another. Sharing his experience, Marton states that “in the kind of research which constitutes the basis for arguing for the discerning of the domain of “phenomenography” we have repeatedly found that phenomena, aspects of reality, are experienced (or conceptualized) in a relatively
limited number of qualitatively different ways.” (Marton, 1981, pp. 180-181) Without this, it would not be possible to end up with a finite set of categories.

**Validity and Reliability of Phenomenographic Research.** A frequently asked question about phenomenographic studies concerns about the validity and reliability of the resulting categories of description as derived from such an approach. Regarding the validity, Marton & Säljö argue that “we do not believe there is any uniform technique which would allow other researchers to go from “the pool of meanings” to the emerging pattern of a hierarchy of similarities and differences. It is a *discovery procedure* which can be justified in terms of results, but not in terms of method.” (Marton & Säljö, 1984, p. 39) The validity of the present study thus should be justified with the resulting categories as described in the next chapter.

However, with regards to reliability, Marton insists that, with the help of interjudge reliability, “once the categories have been found, it should be possible to reach a high degree of intersubjective agreement concerning their presence or absence if other researchers are to be able to use them.” (Marton, 1988a, p. 183) But this has been seriously criticized by Sandberg, not against the categorization but the description of the conceptions. “Interjudge reliability does not take into account the researcher’s *procedures* for achieving faithful descriptions of the individuals’ conceptions of reality.” (Sandberg, 1997, p. 206) This means that the description of the label put on the data may still be colored by the researcher’s own pre-understanding or prejudice.

**Critique of Phenomenography.** Likewise, Webb criticizes the phenomenographic approach by questioning the possibility of the researcher to neutrally understand the
individual conception of the interviewees without any influence from the researcher’s pre-understanding of the phenomenon under study. “The critique above calls into question the ability of the researcher to have pristine perception, make neutral observations, build objective categories and give neutral interpretations: each of these activities is informed by theory and prejudice. It seems likely then that phenomenographic research will tend to report the history of a particular discipline as it is understood by the researchers and as they reconstruct it through the people they interview. Phenomenographic explanation is prone to reproduction of the discourses it studies.” (Webb, 1997, p. 201)

Further to this, Taylor also shares a similar view, “It is curious that phenomenographic analyses of differing conceptions tend to tell us much the same as we can discover by studying the history of attitudes towards the subject in question.” (Taylor, 1993, p. 63)

*Phenomenological Reductions.* To avoid prejudice of one’s own, Sandberg suggests the use of the phenomenological reductions or hermeneutic rules of Idhe (1986, pp. 29-54) as guidelines, which are summarized as follows: (i) Suspend or step back from ordinary ways of looking and set aside usual assumptions regarding things. (ii) Describe the phenomena of experience as they appear rather than attempt to explain why they appear that way. (iii) Horizontalize or equalize all immediate phenomena. (iv) Seek out structural or invariant features of the phenomena. (v) Use intentionality as a correlational rule to reveal how what is experienced refers to a mode of experiencing. Basically I have followed these ideas as the guiding principles in the way that I conducted the whole process of this study.
Representing the CMI Network. I am also aware of my position in managing the CMI network, which I have attempted not to present myself as an advocate or promoter of using teacher networks during the interviews. I have also made clear that this study investigates teacher networks as a phenomenon in general, while the CMI network is only one of the many examples that the teachers could choose to use or not. The teachers were also welcome to talk about any other teacher networks. It turned out that quite often, after rapport had been established, some of the teachers were even willing to give negative comments on the CMI network and praise to other teacher networks!
CHAPTER 4

FINDINGS AND ANALYSIS

The Senses of Purposes of Using Teacher Resource Networks

I started to analyze the whole set of interview data with a question in mind. What kind of purpose is revealed from each of the descriptions on the teachers’ experience on actually using the networks? Expressions relevant to the question are then selected out and categorized in an iterative process between defining a category from several expressions and subsuming an expression under a category. On one hand, a category is jointly defined by a group of expressions with the same essential feature. On the other hand, an expression can be subsumed under an already defined category that the expression shares a certain essential feature. Through this iterative process, categories of description are identified, which describe the teachers’ purposes of using the networks in five qualitatively different ways as below.

♦ Saving Time for Convenience
♦ Finding Supplementary Resources
♦ Finding Ways to Complete New Tasks
♦ Reaching Out of Existing Isolation
♦ Exploring for Personal Development

I will elaborate on these five conceptualized purposes in the succeeding sections. Each category will be exemplified by a variation of different expressions, which jointly describe the various aspects of the same category in a supportive or
complementary way. Alongside this, an essential or invariant feature will be singled out among these different expressions. In a sense, this essential feature characterizes and defines the category on a generality level and makes it distinctive from the other categories. The five conceptions of purpose of using the networks will be examined in this way below.

Conception A: Saving Time for Convenience

*Ready Made and Instant Use.* The most common description on how the teachers conceptualized their use of the networks is an intention of reducing the amount of time in the preparation of the class materials. It is a common phenomena that the teachers mentioned their extremely busy schedules in school, which lead them to look for readily available resources on the networks. With these materials, the teachers can easily develop their own set of teaching materials, specifically for their own classes. Because of this, the sort of materials expected should be ready made and can be used instantly with a minimal effort. The following dialogue between the researcher (R) and the teacher (T) well illustrate this.

R: …Why do you consider our network useful?
T: Actually, what I am looking for is. Like the Question Bank, to see what the questions are. To see whether applicable to me. Because, actually, I am really busy. If possible, I will borrow the questions from it. (Teacher 1, lines 3-4)

T: Sometimes to teach a certain topic, you will ask people around... Are there any good resources? Very simple. Just like web-site. Web-sites amount to ten thousands. To find a suitable one is time-consuming, wasting a lot of time. If there
is any web-site that has been used by other teachers before and is said to be okay. It will be great if I can get this kind of resources. (Teacher 3, line 20)

T: One of the materials [that I have used before] is the one called “Short-sighted and Long-sighted” in the Science section. Because there are lots of photos there, which are ready made. I don’t need to take the photos myself. (Teacher 3, line 48)

*Unfamiliarity with Doing Graphics.* This is especially the case when the teachers are not familiar with a certain technical functioning. Some teachers use the networks for the reason that they do not quite master the graphics editing software packages. When such graphics as picture, diagram or illustration are needed, the teachers prefer to downloading them from the networks, which saves much of their time than preparing the graphics on their own.

R: During the last time you find the questions in the Question Bank. What is your reason to find the questions there?
T: Because I am not good at making graphics. Feeling troublesome to do the graphics.
R: So go to web to find?
T: Right! Find some ready-made ones. No need to do it myself. (Teacher 6, lines 41-44)

T: … Your Question Bank is really useful, especially there are lots of pictures. Really convenient. Can directly help us! (Teacher 2, line 2)

*Modifiability and Adaptability.* Since each Teacher has his individually different need
for his own school’s curriculum, whether the materials on the networks are modifiable or adaptable is considered to be of utmost importance. Otherwise, if the time for modifying the downloaded materials is longer than that for producing their own, there is no point that the teachers should bother about using the networks.

T: Basically, [if] a school requires every teacher to prepare his own teaching software, it will actually take up a lot of his time. Modifying [an existing one] is much easier. This means, if I can have a “shell”. Download a copy of a generic teaching materials, and I can make change to it. This will be very useful. (Teacher 3, line 6)

T: Some of the pictures in the Question Bank were completely scanned in from the paper copies, which cannot be edited. Actually they are not that useful. If they are typed in, and are editable, they would be much useful... Because it is time-consuming for us to prepare the pictures, but if a copy of a graphics that you can modify it yourself, it would become much more useful. (Teacher 3, line 8)

T: Basically, all the questions have to be modified by myself. To change the use of words, the wording. Sometimes not only this. If you look at past papers, the same kind of questions is asked differently in different subjects. In the way of wording and sentence structure. We have to change them to the way it is used in the public examination of our own subject. (Teacher 3, line 16)

*Summary: The Final Goal is To Save Time.* Above all, the final goal of the teachers with the present conception is to obtain a lot of materials in a short period of time to prepare for their own teaching. This can be well illustrated by one of the conclusions made by the teachers that simply put, technology is used in general for the sake of
saving time.

T: 派料最重要，派料！(Giving out resources is the most important. Giving out resources!) (Teacher 3, line 126)

T: [running this kind of networks is worthwhile] because sometimes if you want to give the students a test, and if it can be easily done, saving a lot of time so that you can work on other things. This is definite. We use computer simply for saving time. Being able to achieve the desirable goal will be good enough.

R: Actually, you believe that the most important purpose of using the networks is to save time?

T: Right! After all it is to save time to improve teaching outcomes. This is of great importance. But, if having wasted a lot of time with no improvement on the effects, no one will bother to use it. The principle is simple. (Teacher 3, line 147-149)

Conception B: Finding Supplementary Resources

The second conception is an intention of finding extra or additional resources, which are believed by the teachers to be lacking for the time being but essential for teaching their students. One common indicator of this conception is the existence of a perceived deficiency. With the use of the networks, the teachers want to enrich their teaching with a full variety of teaching materials to alleviate the extant deficiency.

Fulfilling Individual Need. In particular, an obvious instance is to fulfill the individual need of the teachers. Especially, those teachers who teach non-mainstream subjects or
teach students with special ability, are often being overlooked because much provision from recent IT reform is directed to the majority with a larger number of teachers who can benefit. The following quotas are from those teachers in minority.

T: … [The Question Bank] is pretty good. To make it better, because we are a special school, special school, the ability of our students differs a lot, a lot [from the average]. But look at your questions [in the Question Bank], most of them are for normal ability students. Rarely have one for further down the level. Because we are a special school, even band 4 or band 5 do have similar students, the difference between ability levels is much wider. (Teacher 2, line 4)

T: … [Your Question Bank] has not much further improvement [recently]. Concerning teaching subjects, there is still some subjects missing. An example is Technical subject. For example, some of our teachers would often ask, most resources are often piecemeal to certain subjects. Not much variety. Of course, it is difficult to find. Difficult to find these resources. If possible, would it be better to have something for those who have received less attention? Making the network more specialized. (Teacher 3, line 4)

T: … The resources for our Computer subject are rare. Most of the people out there would rather develop Chinese, English and Math.

…

R: Uh, huh, but Computer subject does not have much?

T: Computer subject has not many resources.

R: Even those networks do not have much?

T: No, in most of the time, we do it ourselves.
T: … Even textbook publishers, as what I said before, they would ask, “How many students?” If many, they would develop it. What subjects have the largest number of students? Chinese, English and Math! Never will be Computer. Elective subject. Every school has only twenty to forty students studying this subject. How would they help you to develop it?

R: So Computer would have less?

T: Not only Computer. Other subjects would be the same as long as they are not the major subjects. (Teacher 7, lines 22, 37-40, 46-48)

A Quantitative Favor. The insufficiency or inadequacy is also perceived in a quantitative sense in the present conception. The teachers believe that certain teaching materials now given to them are not enough. Even if available, the resources are likely to be used up quickly in the regular teaching. Hence an ideal network is often said to contain a large quantity of resources. The measuring of the amount of available resources is also a major criteria used by the teachers for deciding and choosing whether to use a network.

R: Sometimes, textbooks are often bundled with many examination questions. Actually would you use these questions?

T: Yes but not often, relatively speaking. For example, the publisher has a CD-ROM for the Computer subject. But these questions may soon be completely used up just right after one school term. One test. One examination. Maybe, we have no way but to re-use many of the questions. Since the resources are rare, we have to search for them in the Internet. (Teacher 2, lines 33-34)
R: Why would you use the Education-city?

T: The quantity is large. For example, certain teaching materials or information will be covered more widely. Relatively more subjects and larger coverage. (Teacher 4, lines 5-6)

T: If the quantity is large, it will definitely be useful. But if the resources are insufficient, there are not many to choose from. For example, you have only fifty questions, and I want to set a twenty-question M.C. paper. Not many to choose from. But if choosing twenty out of a thousand, there will be a much wider difference. (Teacher 4, line 60)

**Materials To Motivate the Students.** Another kind of resources that are considered lacking is some materials that add a favor to the teaching and make the lessons more interesting and attractive to the students. The teachers believe that these materials are inevitably necessary to motivate the students on this day. Even though the motivation is sometimes only extrinsic, the teachers consider it important as the first step to help the students to start to comprehend the contents in the given curriculum.

T: My view is, the workload of teachers is heavy. For example, especially in teaching lower grade students, maybe we need a lot of these IT media to stimulate the students. Expecting some web-sites to help teachers to prepare the lessons.... For example, what I need is some pictures. I teach EPA; so I need some Hong Kong historical pictures. Or web-sites related to Hong Kong history. For example, cartoon and animation. Actually nowadays students need more than cartoon. Have developed into the need of animation. In fact, many teachers can do it. For example, a “Look”, L, O, O, K, like a pair of eyes, rolling round and round. Let
say, teaching Basic Law, some of our teachers has a national flag, which can be waving. Up to this level. Actually, we can find those cartoon, but not to this level. (Teacher 8, line 4)

T: It can be an exercise. Let students pretend to be. Say, you change it to a game format. [Ask the students] to make a mother-board. Having all sorts of hardware parts. All put there. To make the board, the students are like completing a puzzle. Clap the hands when right. Tell the students when it goes wrong. Tell them where the correct location should be. When right, ask them whether they want to know what is inside. If yes, give them a link. Following it. This is RAM. What is the function of a RAM? Why use a RAM? Further explanation and so on. (Teacher 7, line 18)

What makes the present conception different from Conception A is to focus on the supplement and enrichment of the teaching in the classroom. The reason to obtain the additional materials is to make additions to a richer variety of teaching materials in a lesson. As contrast to this, Conception A has the preparation process for the lesson set in focus, with a purpose to shorten the time taken in the preparation. As such, whether there is any improvement in the classroom activity may not be important, and the lessons of Conception A would appear the same as before.

*Materials for Novel Classroom Activities.* On the contrary, the present conception usually includes new classroom activity. One repetitively mentioned activity is to have the students search the Internet to collect information to complete an exercise. Even though a deficiency of materials may not be salient here, the purpose of using the networks is limited to the provision of more additional or supplementary teaching
materials. On the surface, the activity of searching the Internet may look novel. But more careful examination reveals that the students only use the Internet in this case as an extra reading material mainly for information. The deeper sense of the purpose of the teachers is the same as the others mentioned above.

R: Have you ever ask the students to [search the Internet for reading materials]?

T: Yes, too often. Too often. When time is not enough, ask the students to go to the web to search on their own. Find out what the hardware vendors are. Do comparison themselves. The students work on all of these on their own.

…

T: Right, right, look at different companies. What are the functions? Price? Brand names? They search it themselves. (Teacher 7, lines 53-54, 58)

T: … Sometimes to teach a certain topic. Having found some resources on the Internet, which is suitable. We will go to the Internet to get the resources. Or download them for showing the students instantly. (Teacher 4, line 8)

*Materials to Visualize Abstract Concepts.* Further to this, some teachers use downloadable software that can help their students to visualize certain scientific concepts. The teaching of these abstract concepts, which cannot be concretely seen by the students, is often said to be extremely difficult. The use of the software is considered to be useful in making these concepts visible to the students. However, it should be noted that some of the following quotes are borderline cases between the present conception and conception E, depending upon whether the teachers consider the use of the software as a kind of an exploration of new teaching ideas or not. If so, it would be considered to be of conception E, which will be described in due course.
T: …Sometimes go to the networks, not yours but other networks, to get animation. Animation that is related to atomic nuclear fusion. Sometimes use it when available …

…

T: The most difficult thing to teach in Science is those abstract ideas about atom, which are often not seeable. Sometimes teaching Science, those cannot be seen are the most difficult. The students need to imagine. For example, those related to Force. These are abstract concepts. Force and Energy are difficult concepts. Hard for the students. Atomic concepts are relatively difficult. Or maybe to use atomic concepts to explain certain phenomena, which would be a bit difficult. If we have animation, it would be a bit better, seeing the movement of the atoms. (Teacher 3, lines 48, 80)

T: I will read [those web pages] once before. For example, a certain web page is to teach Wave. I will pre-select certain web pages about Wave. Select a suitable one. Then during the lessons, show it [to the students]. A bit interactive teaching.

R: Why did you choose Wave as an example?

T: Because, you teach Physics. Usually it is, because Wave is difficult to teach. For example, those dynamic one, or 3-D. Sometimes solely verbally describe it, the students would not understand. Then using those web pages is the most suitable. Multimedia! (Teacher 4, lines 12-14)

Summary: The Final Goal Is To Enrich Teaching. Common to all of the above is that there is currently a deficiency or shortage of certain teaching materials that the
teachers believe to be important. What varies among them is a variation on the sorts of materials desired. But after all, teaching is still the primary focus; so the teachers usually search with a purpose in mind. They know what to look for, with an ultimate purpose of fulfilling their teaching duties completely.

R: So at the end. What is your view on resource networks? How often do you read those networks?
T: Fair, fair. Just to read on purpose.
R: What do you mean by this?
T: I mean, if I want to find something about Chemistry, say IR, I will look at it in a specific way.
R: Does it mean, probably you need to teach a topic, you would be focusing on [the topic].
T: Right!
R: With this, you go to find out more.
T: Right. Rarely would I search for something aimlessly. (Teacher 9, lines 89-96)

Conception C: Finding Ways to Complete New Tasks

The third conception is about completing a certain task that the teachers hold responsibility. The nature of the task is often only technical or administrative, as part of the job of the teachers excluding teaching. The teachers go to the networks to find possible solution that may be applicable in their situations.

Solving Technical Problems. One common task is to solve entirely technical problems, especially for those teachers who are also in the position of an IT coordinator. Since
the technology is constantly changing all the time, the teachers feel a need to keep up-to-date with the latest technology through connections with more technically knowledgeable people in other schools.

R: … What do you want to know from other schools [through the discussion forum]?

T: Mostly, IT related. This means, with no specific information, because nowadays, most things, like SAMS (School Administrative Management System), the Education Department has not given us much information. All rely on communication with the teachers in other schools, like talking to other participants in a workshop. So, now on the web, other than your center, for example, I do visit the web of the Chinese University. One of the web is especially for IT, it is a forum inside Cyber Campus, specifically dedicated to IT.

…

T: … The contents inside are very good. Mainly, we are facing certain problems, such as how to use the money of the SAMS? Another example is, we now have a lot of problems, like indecent web pages. Those Internet Service Providers can’t help much. We need advice from other teachers. Actually we all face the same problems, we all need to avoid these [indecent] web pages.

…

T: For example, the discussion forum at the Chinese web-site has a very good example. Once someone asked something related to Real Player (a player for displaying audio or video). How to do Streaming technique? This question is very good. Real Server, really technical thing, not related to teaching at all. But, because of this, exactly like our school, which do not have much money. This can help us to set up a Real Server, a Video Server for the purpose of teaching. Really great! I feel that this is really helpful to us! (Teacher 2, lines 25-26, 28, 43)
T: … For example, you need to start a LAN (Local Area Network). How to link up with the network? After linked up, how to dispatch IP addresses. Would there be any problems when you and I do it together? How to do it? Actually, many problems like this. If you are not familiar with the technology, you will need to seek help! (Teacher 7, lines 84)

Clarifying Government Policy. Sometimes the tasks that the teachers need to complete concerns about recently set government policy. The teachers believe that the new policy have not been made explicit enough, and they expect a more step-by-step procedural guide, through which they can simply follow to complete the tasks. It is considered the responsibility of the government to clarify the policy in more detail, even though this may not be always true.

T: … Another main area is about money. Really, we have much money from the Education Department. Just like those for SAMS. Probably, after we have attended a talk, [we] still don’t know what they want us to do. I think this is possible. Give you one more example. While I was attending a seminar, I found the same problems encountered by teachers in other schools, concerning the IT training.

R: About BIT (Basic IT)?
T: Right, many particulars inside are unclear. For example, the guideline of the Education Department is not enough.
R: How to run this kind of BIT training?
T: Right, right. Continue with the IIT (Intermediate IT). Probably, up to now, after such a long period of time. Still, AIT (Advanced IT) has no institute which can
offer … (Teacher 2, lines 46-50)

R: Do you need it?

T: Yes, yes. For example, a new project such as those from the Education Department or Quality Education Fund. For example, we have a multimedia learning laboratory. In progress now. Sometimes when we work on this, such as arranging the place. Or how to select computers? This information, we have very little. Simply have no opportunity to know how other schools have done it. If this information can be found on the web, can be shared. It becomes much convenient. Very important in running these projects. (Teacher 7, lines 67-68)

Responsive to the Tasks. Quite often, the teachers are only responsive to the tasks, passively accepted the obligation as assigned by the authoritative management of the school. To a certain extent, the intention of some teachers of completing the tasks is only to satisfy the demand of the school principals. The teachers simply internalize the values of the principals without seriously examining the reason for doing the tasks on their own.

T: Right, that is not the most urgent one. I think the most important one is, take this as an example, the school wants a teacher to make an Intranet. But what bad luck, he doesn’t know how to do it. Even worst, he has never heard of the term “Intranet”. What should he do? The school principal said that [he] has to do it. At this time, he really need, but time is insufficient. He has to find a way to do it. (Teacher 7, line 62)

Summary: The Final Goal Is To Find a Solution. In the case of the present conception,
the final goal of the teachers is to deal with the problems successfully. The expectation of the teachers is solution oriented that the problems have to be solved by all means. Whether the problem can be tackled thus becomes definitely important and essential. If the problem remains unresolved, the teachers have no point participating in the networks.

T: I think the situation is, because, anyway I believe, other than to participate, I really want someone playing the role of giving advice. It will be better with this role. Because, it is possible that we discuss an issue, and we can reach a situation that many people, after a certain period of time, still cannot solve the problem. After reading this for several times, still with nothing more, I will never read it again. If, converse to this, I have a problem posed, we discuss for a week. We come up with some ideas. Someone helps some of these ideas. I feel that teachers are actually, especially about IT, not unwilling to give advice. But we really don’t know. When no one knows what to do, what can we say? (Teacher 2, line 68)

Conception D: Reaching Out of Existing Isolation

The fourth conception is an expectation to break out of the teachers’ extant isolation. Teaching is often considered as a job that requires the teachers to work individually. The chance to meet the teachers in other schools, even including those schools with similar background, is not frequent. The teachers sometimes feel isolated or insulated from the others in the educational sector as a whole. Let alone other industries in our community.

T: To go to seminars or workshop. But not every Teacher can go. Usually only one or
two can go because of maybe a time clash with the lessons. It is hard to arrange.

R: So it is hard to know

T: What is happening outside.

…

T: … Rarely have any chance to talk about it [with the teachers in other schools]. Because it takes much time. It is difficult to make it.

R: … How do you feel about this kind of interaction with other teachers?

T: Useful but there is no existing channel for the time being. For example, we want to contact [teachers in] other schools, other secondary schools. Even among the governmental schools ourselves, there is no channel that we can use. (Teacher 4, lines 70-72, 80-82)

**Expertise Outside School.** Because of this, the teachers long to know more people with expertise outside schools. It is especially the case for the kind of expertise that most teachers rarely have before but is now highly demanding. Some teachers clearly understand the importance of leveraging on the expertise of others, which may be made possible through the wider connections of the university to the various organizations outside.

T: … Interaction with others is important. For example, I feel that, Chinese University, their own field is Computer, Information Engineering. Say, if I pose a question to there, some unresolved questions after our discussion. There are professional people who could really help us. Solve the problems. Give advice. From this perspective, I believe that the university can help us. Because after all we don’t know enough about the technological aspects.

…
T: This means, your role is to have someone constantly looking at it. I think your contact coverage is wider than ours. You can find someone, who could help the teachers to solve the problems. (Teacher 2, line 36, 74)

Validation on Current Practice. Another intent is a kind of validation on their everyday practices. The teachers have a strong desire to compare their own works with what the teachers in other schools are doing. This is to make sure that the teachers are themselves doing the right things and not deviating too much from other teachers. The networks have provided them one more new way to obtain the information of other schools, which helps not only to understand these schools but also to validate and reassure the works of the teachers themselves.

T: Actually want to know what other people are doing. Because we are often like doing things on our own with the door locked up. Another thing is, what is the purpose of attending a seminar? Actually I go to the seminar, not only to listen to the speakers on the stage, but also to hear what the audience on the floor are talking about.

…

T: … Or to say, look at what other people are doing. If what we do does not make much difference from the others, we are probably on the right track. Otherwise, the others have done something but we haven’t. Then we should make up the deficiency. (Teacher 8, line 40, 48)

T: If you, as a teacher, I believe, … would look at other different teachers, the questions that they set. I believe that you are not really going to use those questions but … The case of HKCEE is really clear, those students will get the
mock papers from many other schools. Do they really need to complete all of them? I don’t think so. But they have an idea of reading each other’s papers. Okay, what topics have been set? From the perspective of a teacher, I would not read the questions one by one. But I would look at how other people set the questions. Also, actually I, as you mentioned previously, the part that you can click on to look at the teaching [of other teachers]. Being a teacher, I will be much interested because I want to know how other people teach a certain topic. How to use a real student-centered learning approach to teach something. I think it is very good. (Teacher 9, line 49)

Extant Insecurity to Exposure. The kind of isolation may also be indirectly revealed through the hesitation of the teachers to share their own teaching materials publicly. Apparently, some teachers are reluctant to show their works to the others for fear that what they do is not yet good enough and will be criticized by the others. But, a closer look at the uploaded contents of many networks will indicate that the works of the worrying teachers are likely to be compatible with those of the others. Thus a lack of more contact with the outside world seems to weaken the confidence of the teachers in their own accomplishment.

T: … If the teachers put it up there, they worry, because what is on the Intranet of the schools is also assessable to the parents of the students, or other teachers can read it on the web … Worrying about that there are people who consider their works as poor, or not good enough… (Teacher 1, line 20)

T: … Of course, the unwillingness to give out [the teaching materials] is because they don’t know whether the materials are done well. Also worry about being
Knowing the Students Outside School. The networks not only provide a means for the teachers to reach out to other schools but also enable the teachers to further understand the students. The teachers often look at the conversation of the students in the networks, where the students have apparently more freedom to express their intuitive feeling than that in the classrooms. The teachers can also know more of the problem or the difficulty as experienced by the students during their study.

T: Others? Will definitely look at the students. I would see what the students write about too. Because, actually, know the own strengthen of both you and me. I will see what the students write about. Sometimes, the students write how good their teachers are. And how bad as well. I will remember all these...

…

R: Subject related concepts?

T: Right, right. Say, you ask. Give you an example. What is the Law of Demand? Usually more difficult than this. Mostly A-Level questions will send up there. I found that the people answered wrongly. Then I, I would certainly look at it. Because, the more questions that people posed up, the more people who do not understand. When I have to teach that topic, I will talk about it more deeply. Or look at the reason why other people don’t understand. Tell the students that many students misunderstand this here. You have to remember it. Tell them this way. So I, as a teacher, go to those forums. Not many teachers send up there. I found many students send questions there. I will look at the questions of the students. As such, very interesting. To me, it is important. (Teacher 8, lines 48, 54)
T: … I took up the [voluntary] role of the Chinese History panel in Hong Kong Campus before. In other words, whenever the students have something they don’t understand. For example, students are really interesting. For example, they will ask you, people often say the 雷鋒精神 (Meaning to sacrifice without any rewards in mind). Who is 雷鋒? Many people answered. I actually have the responsibility to answer…

…

T: To lend a hand to the students. The students of today. They study A-Level. There are not many reference books for A-Level. As such, only to look at the past papers. They write up their own essay. After that, email you and ask you to help them to mark it. (Teacher 10, lines 128, 138)

In comparison of here with Conception C, the teachers of both conceptions converse with other teachers in the network forums in apparently the same way. Even though the acts are similar, the intentions behind are clearly distinctive. The teachers with Conception C have a definite purpose in mind, searching for something that can help them to complete the pre-determined task. On the contrary, the task of the teachers here is not explicit. Instead an urge of having more exposure outside their schools stands out.

Summary: The Final Goal Is to Widen One’s Horizon. This is also the clearest indicator of the present conception. The various quotes or expressions above differ in the sorts of persons to make contact with. But common to all is a longing for escaping the existing insulation in the school. The networks are opening up a window that the teachers can choose to get through and possibly widen their horizons.
Conception E: Exploring for Personal Development

The last conceptualized purpose of using the networks is to improve oneself as a kind of personal development. The teachers with this conception often search over the Internet for anything that can improve their practice of teaching. The need to raise one's own knowledge seems to dominate here.

Information about Learning Opportunities. The simplest case here is to look for any informative about learning opportunities, which could be teacher development seminars or any recent release of publications that interest the teachers. The networks here merely play the role of a promotion channel.

T: … I go to your web mainly for. Using the teaching resources is relatively less. Mainly to look at the activities held by your center. Just like the previous one, your workshop on Teaching with Toys. I mainly go there to see what I can learn. (Teacher 2, line 24)

R: What kind of web pages will you read?
T: … I will read specially which web site. ASCD. ASCD is a web site about curriculum. Look to see any recent books published. Look at their journals. I will also look at the one held by the Education Department. Looking for any teaching staff training. (Teacher 5, lines 57-58)

The Networks as a Huge Book. Apart from this, the teachers usually learn directly from the contents of the networks. One common belief is to treat the Internet as a huge and voluminous source-data book. Though the information is messy and
unorganized, the teachers should be able to make use of the information in their own way and construct their own meaning in using it to improve their teaching.

T: Actually Edu-city, I wish, their original objective is also the same. They put up numerous pieces of information to the web. They don’t want it to be like a book. Or give us the notes of a certain topic. They don’t mean this. What they intend to do is, we go to design our own. Because anyway it needs to be tailor-made. School-based … (Teacher 9, line 17)

T: For example, once a student asked me, what is 九五之尊 (a common way of addressing the emperor). The emperor! Why isn’t it 八四之尊 (the previous expression contains the characters nine and five but it now becomes eight and four) but 九五之尊? Following this. Why vulgar language is called 三字經 (a well known ancient Chinese book)? I said it is not 三字經. 三字經 is really meaningful. “上大人，孔乙己，化三千，七十二，性相近，習相遠” (reciting the contents of the ancient book) like this. He asked like this, and [I think] it could be right. As such, I typed “九五之尊” into yahoo, and typed in “三字經”, which transported me to the Central Research Institute in Taiwan, showing me the whole piece of 三字經. So I did a cut-and-paste, and told the student that this is the 三字經. Mencius said that we split it up into three-characters by three-characters, to make it easier. “性相近，習相遠” means that we were born to be good, like each other. But the process of learning makes the difference. We get further apart. I answered them in this way. This is the function. (Teacher 10, line 58)

New Teaching Ideas. There are other teachers who are not satisfied with the current practice of teaching, hoping to move beyond the present level through a search for
new teaching ideas. This is especially the case for teaching the many decontextualized contents in the existing curriculum. The teachers try to seek the original meaning of the contents so that the students, as well as the teachers themselves, feel meaningful and intrinsically motivated to participate in their learning.

T: The one about Pythagoras’ Theorem is very good. It even shows you the whole process. It contains more than just one piece of worksheet, it tells you that through a certain activity, the students can know more about the history of the Pythagoras’ Theorem. Or more about investigation. For example, part of it is very interesting. It was placed a Babylon, Egypt or Babylon I am not very sure, stone tablet about the ancient civilization. Something dug out. There are words craved on it. It is a right triangle with numbers on the three edges. I think the textbooks have not made it so clear. I look at my textbook. Though it mentions the persons who once talked about Pythagoras’ Theorem, it will not capture so clearly the picture. More than this, there are some questions for discussion about the history. I think I myself feel really excited. For example, why the numbers used by the Egyptian are not small, some are really big numbers. The three edges. Why the three edges are made so big the numbers? Look for the relation. This, I think, give students, or when given to the students, the students can see really the efforts made by the people before. Carved this on the stone. The students would feel interested. Why such big numbers? The tool for measurement should not be simple. Why would they? I think, this kind of materials provides something an average textbook cannot give you.

…

T: That time I have to teach the Pythagoras’ Theorem. I think solely teaching this topic would be boring. I feel bored myself. Not much to talk about. The square of
the inclined edge equals the sum of the squares of the two straight edges. The textbooks do not provide any especially interesting contents, something fun. As such, that time, I suddenly want to go to the web, searching only. Typed in “Pythagoras' Theorem”. Not sure I search it out or someone recommended it, I can’t clearly remember. But I found this material, this content, is more interesting than the textbooks. Besides, it is really not that boring. With this, you can enrich the topic. No longer solely teaching the formula. If simply teaching the formula, maybe after teaching this, ask the students to do the calculation. Give them a lot to calculate. Then the students will not know about the ancient people, how they discovered the theorem many years ago. Have no chance to look at the tablet. It has a story of itself. Really fun…

…

T: Besides this, I want to check whether there is any new idea. New about teaching Pythagoras’ Theorem. (Teacher 6, lines 18, 36, 38)

T: … For example, some teachers feel really troubled and bored, repeatedly teaching the same things. Some schools do it this way. How they teach? They, the three subjects Chinese, Chinese History and Moral Education, they would cooperate and teach all three subjects together. How to teach? We set this teaching schedule, let’s say at the end of August and then announce it in September. To teach the first lesson of this subject, and then the second lesson of that subject. In this way, it was pre-set together before. I teach “出師表” (A text about going out to battle in the Chinese subject) … Chinese History makes a compromise. When I will be talking about the Three Kingdoms 三國. Okay, come on, I teach this 諸葛亮 (an ancient military officer). And the part of Moral Education? They talk about loyalty is one thing but uncritical follower-ship is another thing. When we see something
righteous, we sometimes have to give up other principles. In this way, the three subjects work cooperatively. Work together. The students would at the same time understand these things. Ah, we can teach it in this way. Maybe you can also put this concept into the CMI network… (Teacher 10, line 90)

Learning From A Variety of Cases. To enhance one’s own teaching of a topic, some teachers believe the best way is to be exposed to a whole variety of different ways of teaching the same topic. Because of this, case studies of other schools about how the teachers in the different schools deal with a concrete problem appeal to many of the teachers. Teaching in a classroom is so complex that the teachers hope to establish a wide repertoire of teaching approaches, which can be flexibly selected at one’s own discretion to determine the course of actions in the different situations. Only after equipped with these various approaches, the teachers can begin to invent their own innovative approach to teach.

R: So interaction gives you a chance to look at other schools. As an example, see how they do it.

T: Right, right, right. It can. Not necessarily give you a solution. Only some case studies. I think this would be much better. Because, if you use a solution approach, which may conflict with the curriculum reform. One idea, maybe every school is not the same as the others. Also may not be applicable. I think, maybe some case studies. For example, a certain school with what banding, how to implement this. How about Band two and three? Using a case by case approach for the teachers to study is much better. This is one model. (Teacher 2, lines 63-64)

T: Right. I think, the one [about the case studies of different good practice of IT use]
is very good. To teachers, it is simple. After reading the video, and the analysis appended. It clearly groups the cases into different models. To teachers, because this is uncommon. Many people talk about IT teaching, but they just talk about the technique of IT, seldom about using IT to teach.


T: What kind of change [in myself]?! For example, we teach a lesson. We need to lead the major of the students. More important than following a textbook. The teachers would think about, using different methods to handle this classroom. Now there is one more choice of computer. I think, there are many choices for teaching.


T: A very strange thing is, I teach the same class of students. From my teaching experience, I teach the same class of students. Maybe today we can use this approach. Tomorrow using the same approach, it does not work for the same class of students. In this case, we need to change [in the approach]. This change is so quick. Talking about the change in teaching. This change needs to be quick. Instantly depending on the situation of the classroom. Use what kind of change. The question is here. As such, the exposure of teachers is important.


T: … From my understanding of my colleagues and my school. Actually I do training in the school, doing staff development. My way of doing the training, actually my inclination is to attend seminar and talk about exposure. And how to get hold of the most important thing in the reform. … What do my colleagues need the most? It is how to let them survive in the classroom. Especially for teaching children. Maybe a little bit slower in their response, their approach is a bit ordinary, maybe they will not be able to survive. So, teaching approach is
important. Teach them how to teach. Also, we talk about changes. Changes need the foundation. The foundation is to master the A, B, C, D and E. After that, we can have more changes. Today, A doesn’t work, I use C. C doesn’t work, I use D. It is in this level, I finish the A, B, C, D and E. After this, you flexibly apply and choose how to use it. Then you invent your X, Y and Z. As such, from the perspective of a teacher, the teachers need, I am talking about my school, may not representing the others, some very concrete know-how, which can be used in my teaching. This is the way. (Teacher 5, lines 10, 66, 76, 98)

Unexpected Fascination. An essential feature that makes the present conception distinctive from the previous ones is the inclusion of a kind of unexpected wonderment or fascination during the process of searching. There is always an exploration of new ideas, which are unknown to the teachers before. The teachers are often characterized in terms of liking to take up new challenges and to experience unfamiliar situations.

T: Referring to the questions of other schools… Some of the questions are in such a way that you can never think of… (Teacher 3, line 18)

T: [I know little about IT] But I think it is the beginning. I would never, because I don’t know Changjie 倉頡 (a Chinese input method), feel disabled in computer. But I will also think that my growth is a kind of exploration. Many teachers, I think many teachers, because IT came so quickly, the children learn faster than we do. They are learning about making a web-site, writing web pages. We can’t upgrade ourselves as quickly as the children do. So many teachers are now in a stage of exploring, including me. I, in my exploratory stage, have to look at this
one and look at that one, and afterwards, I can find what the choices are. And then develop my own approach. It should be like this. So now, you may wonder, I am just looking around. When I find something suitable, I will download it. But probably not yet entering the classroom. But this is definitely important, definitely. Using it in classrooms after looking at it is the ultimate goal. This is my view.

(Teacher 5, line 56)

R: Why were you looking around, searching for these things?
T: Want to know more. Because when you are going to teach this, you certainly have to know more about what you teach. Only in this way, you can teach better. This means, when you teach it, you would have more to talk about. You, yourself would not feel bored either. You would no longer only talk about what is in the textbook. You can tell them more than in the textbook. (Teacher 6, lines 47-48)

R: Interesting, then how did you [apply for the post of subject officer]?
T: Hong Kong Campus, I go there. They said [on the web] looking for Chinese History subject officer. Then I applied for it…

R: Are you paid for it?
T: Absolutely no!

…

R: What is your purpose of doing this?

…

T: The personality of everyone is different. I am those who love to try out new things … (Teacher 10, lines 131-134, 151, 154)

The teachers here also play a more proactive role in using the networks
themselves. The need to continuously improve oneself is taken as one’s own responsibility. Thus the teachers often take the initiatives to better their current practice of teaching rather than doing it for the sake of the others. This further distinguishes the present conception from the previous ones, and especially Conception C, where some of the teachers use the networks to fulfill the tasks as requested by the school management.

Summary: The Final Goal Is To Improve Oneself Continuously. All things considered, the most important indicator in the present conception is a desire to improve one’s practice of teaching. The teachers consider professional development as a continuous process, which requires constantly striking for better teaching approaches to teach the same topics. Only through this continuing exploration of new meaning, the teachers become confident to call themselves a qualified teacher.

How the Teachers Derive Meaning from Using the Networks

At the risk of oversimplification, I want to make in this section a total claim that we can actually dichotomize the previously mentioned five conceptualized purposes into two poles of how the teachers derive meaning from using the networks. On one side, the teachers believe their existing practice of teaching is unproblematic and the way forward is to support and provide them with more extra resources. With no specialty, the networks are just one convenient way of delivering the content materials. On the other, the teachers are not satisfied with the present practice of teaching. They actively explore new practices with the use of the technology as an improvement or growth of themselves. But before elaborating on this, I want to justify that the five categories of conceptions indeed form a continuum that actually leads the teachers to experience
and conceptualize their use of the networks in the five different ways.

Some Counting on the Conceptions. After the five categories of conceptions had been established, I applied once again these categories to re-codify all the expressions of the teachers in the interview transcripts. One expression is here operationally defined as one example that the teacher mentioned of an instance of using a network. The numbers of expressions that are relevant to the current study on the purposes and as well exhibit a certain conception have been tabulated for each of the teachers as shown below. The darker the colors of the cells in the table, the higher the number of occurrence on that particular conceptions. Closing one eye and “squinting” another on the table should make salient which categories of the purposes that one teacher dominantly mentions.

<table>
<thead>
<tr>
<th>Categories of Conceptualized Purposes</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 1</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td>9</td>
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<td>5</td>
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<td>3</td>
<td>5</td>
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<td>Teacher 3</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td></td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Teacher 4</td>
<td>1</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Teacher 5</td>
<td></td>
<td></td>
<td>2</td>
<td>9</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Teacher 6</td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Teacher 7</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td></td>
<td></td>
<td>12</td>
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<tr>
<td>Teacher 8</td>
<td>4</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Teacher 9</td>
<td>1</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
<td>7</td>
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<td>Teacher 10</td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18</td>
<td>39</td>
<td>11</td>
<td>12</td>
<td>39</td>
<td>119</td>
</tr>
</tbody>
</table>

Table 1. Inclination of the teachers towards certain conceptualized purposes

For example, most of the purposes mentioned by Teacher 3 fall into the first two
categories, which indicates a strong favor of the teacher for obtaining more resources. As contrast to this, nearly all of the purposes of Teacher 5 are classified into the last category, which means that the teacher essentially explores the networks for personal growth or improvement.

It can also be found in the table that all of the teachers have more than one category of conceptions. For example, the conceptions of Teacher 4 cover all five categories of purposes. Likewise, every category of conceptualized purposes is also mentioned by more than one teacher. As an example, conception B has been referred by eight of the ten teachers.

Correlational Relationship Amongst the Conceptions. It is apparent to me that a teacher who refers to a particular conceptualized purpose tends only to mention those conceptions nearby the referred purpose. Radical shifts from one pole to another do not seem likely. To validate this, I calculated the Pearson correlation coefficient amongst the five conceptions with the following results.

<table>
<thead>
<tr>
<th>Correlation Coefficient</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>0.35</td>
<td>-0.22</td>
<td>-0.71</td>
<td>-0.34</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>0.30</td>
<td>-0.42</td>
<td>-0.65</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>0.22</td>
<td>-0.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>0.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the correlation coefficients show that the five conceptions do not seem to cluster together in a clear-cut way. However, strikingly and interestingly,
each of the conceptions does correlate positively with the conception adjacent to it. The further away a conception is from it, the more negative will be the coefficient. This evidence supports the idea that the five conceptions can probably give shape to a continuum. In what follows, I will further describe in detail how the teachers in the extreme poles of the continuum make sense of using the networks, which leads them to conceptualize their purposes as such.

The Continuum from Resource Orientation to Growth Orientation

To reflect and thematize the five straightforward conceptions of purposes as a whole, I will in this section focus on the specialty of the teachers at the two extreme poles. Their beliefs will be characterized and contrasted against each other to illustrate how differently the uses of the networks are meaningful to them. I will call the first pole Resource Orientation and, as contrast to this, the other pole Growth Orientation, as depicted below.

The Five Conceptualized Purposes

<table>
<thead>
<tr>
<th>Saving Time for Convenience</th>
<th>Finding Supplementary</th>
<th>Finding Ways to Reaching Out of Complete New</th>
<th>Exploring for Existing Personal Development</th>
</tr>
</thead>
</table>

Figure 1. Continuum from the resource to growth orientations

To put it another way, there seems to be a gradual development of teachers from one pole to the other, the process of which can be described as follows: Teacher
networks first appeal to a teacher for saving time in his preparation of present work. While using the networks, the teacher notices the availability of supplementary resources, which can as well enrich his teaching. At the same time, the teacher is assigned new tasks due to recent reforms that he has no idea to deal with. He happens to find some ways to complete the tasks on the networks through learning from the experience of other schools. Over the conversation with other teachers, the teacher furthers to find the possibility to reach out of existing isolation with the boundary of his own school. Over time, the teacher finally comes to the conclusion that the experience of using teacher networks can be an exploration of novel ways of teaching as a part of his own personal development.

Succeeding sections will describe the characteristics of the teachers at the two poles. Their belief in the practice of teaching, the recent reforms and the use of technology at large will be particularly highlighted and how these perceptions on work context lead them to conceptualize the purposes of using the networks as such will also be discussed.

**Resource Orientation**

*Content with the Present Practice of Teaching.* The teachers at this pole hold a more rigid perspective on how teaching can be done. They consider their present practices of teaching as skillful and well sophisticated. Further advancement in teaching approach that will greatly and dramatically improve the effectiveness of their teaching is regarded as improbable and unlikely to happen. As such, the way forward may not be a drastic change in the approaches of teaching. Some of the teachers even consider the discussion about pedagogical theories as not their favorite.
T: [What is useful to teaching is] nothing special. First you digest all the content of your topic. Nothing special. Teaching is from your existing content. There are only two modes. One is to get our teaching content across to them. Or you motivate them. Make this topic interesting to them. After that, give them many web sites to look for. They can go to learn it themselves. These two modes are all possible. (Teacher 7, line 52)

T: [The web sites on the networks] are most useful for the preparation of a lesson. For examples, you have some information about teaching. Those educational theories, I think, hmm. In terms of preparing lessons, this is relatively, hmm, less, hmm [useful].

R: I see. Maybe only when you have time.

T: When you have time. Being interested. Or doing research. Certain topics, we can go deeper to look at those. (Teacher 4, lines 44-46)

T: [Discussing teaching practices with the teachers from other schools] This may only happen when studying in educational institutes. Only studying a educational certificate, you would do this. In general, when not studying, we seldom do this. Most of the time, we just talk about this for only a few words. (Teacher 3, line 74)

A Reducing Teaching Space. Indeed, the teachers are working very hard and putting much effort to their teaching. However, the recently prescribed policy from the government is perceived by them as to further taking away much of the available space of the teachers. The workload of the teachers tend to increase continuously and endlessly with no likelihood of lowering, which makes the teachers remarkably busy
and totally engaged with an enormous amount of day-to-day teaching works.

T: … Many devoted people do have no time. This is problematic. You look at education in Hong Kong. The government, for these so many years, is non-stop adding more things. Have you ever seen her cut down any one thing? From the very beginning, new policy was all continuously adding up. When you continue to make addition, the works of the teachers will continuously accumulate. Right? Everything coming down to us, we talk about it in the meetings and implement. Have you ever seen? I can count many things added to us from the government. But I can never count any one thing that was taken away. It becomes no more time left. Sometimes, you said to obtain opinions. I think, are from those association, teachers union, or what principal united association. Can individual teachers say anything? It is so busy that it is no way. We stay working here in this school until seven or eight o’clock at night. (Teacher 7, line 68)

T: … You want to make your own notes, you actually have no time. Because you have so many classes of students. More than 15 classes. Also teaching Civil Education, E.P.A., Typing Classes…

…

T: 298 pieces of assignments, 15 classes, 298 pieces. All have to be graded…

(Teacher 1, lines 24, 52)

The Call For More Resources. Because of this, the teachers believe that extant problems in our educational system have mainly arisen out of a lack of support to the teachers. Improvement should be directed towards providing the teachers with more resources in terms of both teaching materials, which are not necessarily enabling a
new kind of teaching practices, and as well as more man power to share part of the current workload of the teachers.

T: … Say, our government. Why does she use so much money to organize those BIT or IIT courses? Wasting efforts. Why not training up one or two more sophisticated people. Use the money to employ one or two people sophisticated in this. Put them to the schools. Any teachers who have a certain topic and want to make it more multimedia teaching materials can ask this colleague helper. Can have direct interaction. Converse with you directly. Whatever effects you want to make. They can tell you right away. And do at once. Anything you want to modify. Because he is in the school, he can do it… Actually, the government used not small amount of money in those BIT and IIT courses. Why not let the teachers not to learn it. Ask people to do it… (Teacher 7, line 124)

With this belief, the teachers at this pole make sense of the teacher networks with no exception but one of the means of delivering more resources. As such, the teachers appear in the networks to look desperately for instantly usable teaching materials that can reduce the time for preparing a lesson and extra materials to alleviate the problem of the shortage of resources.

<table>
<thead>
<tr>
<th>Resource Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saving Time for Convenience</td>
</tr>
<tr>
<td>Finding Supplementary Resources</td>
</tr>
<tr>
<td>Finding Ways to Complete New Tasks</td>
</tr>
</tbody>
</table>

↑
Content with the Present Practice of Teaching

A Reducing Teaching Space

The Call For More Resources

Figure 2. The perceptions on the work context that influence a resource orientation

Growth Orientation

*Focusing On Problems of Present Teaching.* On the contrary, the teachers at the other pole are not satisfied with how teaching is presently conducted. Over the whole process of teaching, they spend most of the time attending to and thinking through all the encountered problems. Even though the teachers may not have the solution to tackle the problems entirely, the question of how to make it better is always borne in their mind.

T: … Some of the topics are difficult to make students feel motivated. Or a topic is difficult to be related to their everyday life. For example, Sine and Cosine. Many people said it was related to Astronomy before. But actually how? It seems no one have any information. What can we give to the students? (Teacher 6, line 124)

T: … Usually what topic is relatively boring? Those give you an equation, and then ask you to determine. To compute. An example is Equivalence. Some are those Quadratic equations. Ask you to solve a quadratic equation. Simply put, give you a formula, and ask you to compute, but you don’t know the purpose of that formula. Or after calculated many times, you know pretty well that rule and that formula, but then. So what? Those are boring. Besides this, sometimes determining the area of a circle is boring too. The formula for determining the
area of the circle. Computing in the same way. How big this circle? How long the radius? The students think they are doing the same thing, just substituting to different formula. Will never think there are any more thing fun. Actually, many things about a circle can be debated. Why? How that formula was determined and found out? Could we have some activities to let the students play? Or how this prime number was discovered in the history? I think, actually, for every topic, you can enrich it. I think the most important thing missing is the history of mathematics, in our mathematics education training ...(Teacher 6, line 140)

*Critical Towards the Use of Technology.* The teachers not only problematize the present practice but also hold a more skeptical or critical view towards the recent trend of using the technology in teaching. Rather than simply adopting to convert the teaching materials into technological formats, the teachers tend to think more deeply about the nature of the technology in the practice of teaching.

T: … Sometimes I think. Let’s say Power-Point. It seems Power-Point is already all about information technology. I think the question is not that simple. Though I don’t deeply understand the question either, I think information technology is absolutely not that simple. But still we cannot say, a Power-Point can replace the position of a teacher in the classroom. Click one or two slides in Power-Point. Something pops up. These are simply techniques. The most important thing is, how teachers can effectively make use, and concert with other teaching methods of the teachers. (Teacher 5, line 15)

T: … Before, we were all blinded by IT, thinking that chalk-and-talk is a flop, useless and superfluous. If you don’t take out any teaching aid, like computer or activity
in the teaching, you became lagging behind, not to improve yourselves. Actually I think this is wrong. We should better say, it should emphasize in teaching the interaction produced by both the teacher and the students in that particular lesson. Difficult to describe. Sometimes you take out a computer, show, show and show. After that, the students cannot learn anything. But sometimes in the lessons, you simply chat with them, they can learn a great deal. Many different things. For example, I went to Harvard to observe their lessons. How their lessons look? I cannot see the whole lesson with Power-Point, whole lesson going to the web.… (Teacher 10, line 84)

*Exploring Their Own New Practices.* Interestingly, the teachers here rarely complain about any busy schedule at schools. Rather, the recent reforms seem to offer the teachers with more choices for selection. The teachers tend to see changes as new opportunities, which requires their active participation to reason about and to try out what is specifically workable to them. Particularly, regarding the use of the new technology, the teachers consider not the technology itself the utmost important but rather the kind of applicable practices that counts.

T: What are the changes [with the introduction of the technology]? For example, what we have to do now in the lessons is to lead the major of the students. It is more important than following the textbooks. Teachers have to think. Using different methods to manage this classroom. Now we have one more choice of the computer. I think we have more in terms of the teaching approaches. (Teacher 5, line 66)

T: [Is it useful?] But it is difficult to say. If you say no, it depends on what type of
school the teacher is teaching. Give you an example. I recently read a site called the Chinese web. I am not exactly sure about the name. I clicked to go inside. All the things are very difficult. For example, it mentions poetry in the Sung Dynasty. Really difficult. This, I think, is not suitable for teaching junior grade students in secondary schools. To me, myself, to look at it during spare time is no problem. But at the same time, this is not necessarily suitable. But it doesn't mean the web is problematic. This web may not be problematic to other schools. (Teacher 5, line 20)

With this in mind, the teachers at this pole derive meaning from the teacher networks as a way of exposure to variations of workable teaching practices being implemented in different schools. Apparently, the teachers search the networks for new practices as well as actively finding out new ways to realize the potential of the technology. The networks are regarded as an extension to strengthen the connections to the others outside the school, escaping from the previous isolation.

<table>
<thead>
<tr>
<th>Growth Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaching Out of Existing Isolation</td>
</tr>
<tr>
<td>Exploring for Personal Development</td>
</tr>
</tbody>
</table>

| Focusing On Problems of Present Teaching |
| Critical Towards the Use of Technology   |
| Exploring Their Own New Practices        |

Figure 3. The perceptions on the work context that influence a growth orientation

The following table summarizes the difference between the characteristics in the
beliefs of the teachers at the two poles.

<table>
<thead>
<tr>
<th>Conceptualized Purposes</th>
<th>Resource Orientation</th>
<th>Growth Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Saving Time for</td>
<td>Reaching Out of</td>
</tr>
<tr>
<td></td>
<td>Convenience</td>
<td>Existing Isolation</td>
</tr>
<tr>
<td></td>
<td>Finding Supplementary</td>
<td>Exploring for</td>
</tr>
<tr>
<td></td>
<td>Resources</td>
<td>Personal Development</td>
</tr>
<tr>
<td></td>
<td>Finding Ways to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete New Tasks</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perceptions on Work Context</th>
<th>Resource Orientation</th>
<th>Growth Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content with the</td>
<td>Focusing On</td>
</tr>
<tr>
<td></td>
<td>Present Practice of</td>
<td>Problems of</td>
</tr>
<tr>
<td></td>
<td>Teaching</td>
<td>Present Teaching</td>
</tr>
<tr>
<td></td>
<td>A Reducing Teaching</td>
<td>Critical Towards</td>
</tr>
<tr>
<td></td>
<td>Space</td>
<td>the Use of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technology</td>
</tr>
<tr>
<td></td>
<td>The Call For More</td>
<td>Exploring Their</td>
</tr>
<tr>
<td></td>
<td>Resources</td>
<td>Own New Practices</td>
</tr>
</tbody>
</table>

Table 2. Comparison between resource and growth orientations

Some Quantitative Results. After having accomplished the above results of this study, I examine once again the findings of the survey that we previously administered to the schools in light of the resource to growth orientation continuum. One of the things that interest me is to find out what precisely characterize those teachers with a resource or growth orientation. There is one question included in the questionnaires asking about the kinds of service that the teachers expect our network to provide, which I took it as indicating the orientation of the teachers. Out of the 256 returned questionnaires, Pearson correlation coefficients were calculated between the orientation of the teachers and other attributes of the teachers such as the grades and the subjects that the teachers are teaching. The results indicate that most attributes do
not seem to relate to the orientation of the teachers but the number of years of teaching experience shows a weak positive correlation with the indication of a growth orientation. See below.

<table>
<thead>
<tr>
<th>Expectation of the teachers on the service that our network should provide</th>
<th>Correlation coefficients with the number of years of teaching experience</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource orientation</strong></td>
<td></td>
</tr>
<tr>
<td>(i) Providing teaching materials for downloading</td>
<td>-0.04</td>
</tr>
<tr>
<td><strong>Growth orientation</strong></td>
<td></td>
</tr>
<tr>
<td>(ii) Fostering exchange of experience among teachers</td>
<td>0.17</td>
</tr>
<tr>
<td>(iii) Providing information about mother-tongue teaching</td>
<td>0.17</td>
</tr>
<tr>
<td>(iv) Giving expert advice on language and subject matters</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Table 3. Correlation between expectation of teachers and years of teaching experience

By this is meant that the longer the period that one teacher has taught, the more likely that the teacher recognizes the importance of sharing experience with other teachers and seeking advice from experts, which clearly shows a growth orientation towards improving oneself. However, regarding an orientation towards obtaining more resource or not, there is no significant relation to the years of teaching experience.

*Final Note.* Notice that I do not mean to cast a negative tone upon the teachers taking any one of the approaches. Throughout the interview, I have indeed met very experienced and inspiring teachers, who have been categorized into using either one of the approaches. Rather, I believe that the teachers just focus on the different aspects
of the multi-stable reality of how to succeed in the professional development of a teacher. Both being hard working and with thorough thinking are of equal importance, which can be best described as the ancient Chinese saying goes:

業精於勤而荒於嬉
行成於思而毀於隨
唐‧韓愈(768-824)

3 In translation, Han, Yu of the Tang Dynasty (768-824) talked about the two important attitudes towards learning. First, we will master our studies well as a result of hard working, but will fail as we fool around. Second, we will succeed in our work as a result of thorough thinking, but will ruin as we follow the others. To a certain extent, this is in accordance with the two orientations of teachers in this study.
CHAPTER 5

CONCLUSION

To summarize, I began this study with the aim of exploring a better model for running the CMI network. My experience from operating the network has indicated that only a few teachers will contribute to the resource repository and will actively participate in the discussion forums. This may impede our objective to foster the interaction among the teachers from different schools and to build up knowledge collaboratively. As such, questionnaires were administered to the teachers. The results show that the services that the network provides have almost exactly met the need of the teachers but the survey does not tell much about the deeper attitude of the teachers of what their purposes are and how the teachers actually make sense of using the network.

A qualitative study to examine the more basic and philosophical question was then conducted with the context extended from particularly the CMI network to teacher networks in general. Ten teachers with different backgrounds were interviewed during my visits to the schools. Each of the interviews lasted about forty minutes. Since this study investigates the conceptualized purposes of the teachers, I have chosen to use a phenomenographic approach, which is often used for studying conceptions, to analyze the interview data.

Out of the analysis of the interview data, the teachers are found to conceptualize their purposes of using the networks in five qualitatively different ways. (i) saving time for convenience, (ii) finding supplementary resources, (iii) finding ways to complete new tasks, (iv) reaching out of existing isolation and (v) exploring for
personal development. To further rise above this, I have thematized the conceptions of
the teachers and taken them as a whole into a continuum from a resource orientation
to a growth orientation. The resource-oriented teachers ascribe existing problems to
the shortage of resources given to teachers, whilst the growth-oriented teachers
consider exposure to various teaching practices as personal development to be of vital
importance.
CHAPTER 6

DISCUSSIONS AND IMPLICATIONS

In the Shoes of the Teachers

- Implication to Network Designers

The main contribution or the output of this phenomenographic study lies in the full and vivid description of the five categories of how teachers experience their purposes of using teacher networks and the abstraction of the categories into a continuum from a resource to a growth orientation of teachers.

In light of these results, I am now back to the beginning of this study, discussing the questions of why not so many teachers take active participation in the conference on the teacher networks, and why only a few teachers are willing to contribute their teaching materials to the networks.

From the Perspective of Teachers. I attempt to address these questions from the perspective of teachers as the actual users of the networks. This perspective is important because how teachers would go about using the networks are certainly influenced by what the teachers believe to be the reasons for using the networks, which may perhaps differ widely from the original belief of the network organizers in starting the networks. As Ihde puts it, “what was to become their [the technology’s] extremely important set of social uses ultimately entailed little of the original designer intent.” (Ihde, 1993, p. 116)
Out of the present study, the data suggest that the teachers regard professional development as only one of the many components in their regular teaching in schools. Other components of their teaching such as hastening to prepare teaching materials, clarifying new policy from the government, tackling technical problems and other daily chores are also their pressing concerns, which are even more likely to need prompt decisions and actions than professional development. In most of the times, like everyone else, teachers focus their attention on handling the more urgent matters, which however downplays the importance of teacher development.

This change of our perspective to that of the teachers also brings our receded assumption of a teacher education network back to the foreground. We, as network organizers, tend to be unaware of our taken-for-granted belief of a need to continuously discuss and negotiate the evolving meanings with other people, probably being imbued by the social constructivist theory of learning. When we ask why the teachers do not actively participate in the discussion, we are actually expecting and imposing a belief that teachers should have active participation. We seem to assume that teachers also believe in the same way. But, as a matter of fact, this may not be the case. Without seeing the value of this, the teachers are unlikely to know for what reasons that they have to come to discuss on the networks. As the data shows, some of the resource-oriented teachers simply consider without any doubt that their teaching is
unproblematic, then for what reasons they have to discuss about their teaching.

**A Platform for Sharing?** Many teacher resource networks are fundamentally based on a plausible strategy of providing an open platform, where teachers can then share their teaching materials with each other, saving the efforts as a whole. However, I would rather take the position that this would not be an efficient strategy in building up a network. The reasons are as follows.

As the data of this study indicate, when teachers come to a teacher network to seek for resource, they use it for the purpose of saving time and minimizing the troubles in preparing a lesson. Uploading teaching materials for the betterment of a community as a whole, but not specifically concerning themselves directly, tend to be regarded as taking up more of their limited time and energy. Even worst when the teachers are required by certain regulations to contribute back to the networks in return for downloading more additional resources. In this case, the teachers would rather choose not to use the networks and instead switch to using other media such as textbooks by other publishers, which are more handy and convenient in terms of the time required to finish the tasks in the minds of the teachers.

This skepticism towards that leaving an unattended open platform can hardly achieve the accumulating of a rich resource repository concurs with Rice (1989), who argues against the efficiency in producing information on the networks from the viewpoint of regarding the information as a kind of economic commodity. As the owners of specific information on the networks are hard to identify, the benefits and costs of the final product cannot be fully and correctly allocated. Unclear ownership of the information thus results in an under production of new information.
**Proposed Models of Running a Teacher Network.** It is easier to pick holes in the approach of other people than to propose a flawless approach of one’s own. But, for the purpose of raising further discussion, I will describe two complementary models of operating a teacher network. On one side is the **Segmented Model**, in which all teachers are segmented into different target groups according to their orientations towards using the network. Each teacher network should then be positioned to concentrate on the need of one particular group of teachers. On the other, using an **Integrated Model**, a teacher network should bring only one specific subject topic to the fore and cater for the interest of a variety of teachers on that particular topic, regardless of their different purposes of using the network. Below is a comparison of the two models.

<table>
<thead>
<tr>
<th></th>
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<th>Multiple subject topics</th>
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<td></td>
</tr>
<tr>
<td><em>multiple purposes</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serving teachers with</td>
<td>Segmented Model</td>
<td></td>
</tr>
<tr>
<td><em>single purpose</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5. Two models of running a teacher network

In what follows, I will take this further to elaborate on the two models one by one.

Regarding the **Segmented Model**, one must make a differentiation between teacher networks with a resource and a growth orientation. A resource-oriented teacher network essentially focuses on the production of teaching materials in a large quantity, with a full coverage of the specific need of teachers, even including well-
printed and elegant presentation for teachers to get the attention of students. I would consider this more of the concern of textbook publishers, who may take this as a new model of publishing teaching materials on the network. But this may not be what a teacher educator feels enthusiastic about. Rather, I will concentrate on a growth-oriented teacher network, which can be developed in three stages.

First, a teacher network should better start off not on the network. As I have argued throughout this chapter for the importance of having a shared belief and value with teachers, it would be easier to achieve this through a common experience in seminar or workshop. Or even better would be as an extension growing out of a training program for those teachers who have been an educational qualification in the university together. The role of network organizers should rather retreat to facilitating and mobilizing the teachers, sometimes even have to let the teachers to take the lead in directing the development of the network. But, at the same time, the network organizers should also establish themselves as experts, probably through bringing in the experience from foreign countries in the literature, so that the teachers would believe that the organizers have the expertise outside their schools.

Second, the initial “seed” resources of the networks are collected from the teachers. The organizers may consider offering to evaluate and give suggestion to the teachers on what they have handed in so that the teachers are more willing to contribute as a kind of validation of their works. But the teachers must also be told of an obligation to allow the organizers to put their teaching materials up publicly on the network for sharing with more teachers in other schools. Especially for those with a growth orientation, the teachers are usually willing to accept this in this way, and in effect making addition to the resource repository on the network.
Third, the collected teaching materials are made available on the network in a format, which can be easily downloaded and modified so that other teachers can use instantly. The reason behind providing the teaching materials is to attract and to bring in more new teachers so that the repository of the content of the network can continue to grow.

A complement to the above is the Integrated Model, which places emphasis on the subject content rather than the orientation of the target teachers. A network in this model focuses on one specific and concrete topic so that the collection of resources is enough to form a variation of different approaches for dealing with the same topic. Out of the approaches of the teachers, the organizers can then abstract and synthesize into more general principles applicable to other situations. Both the resources and the principles will be put up on the network and made available to all teachers.

In this way, the network has a salient advantage of taking on *multiple layers of meanings* to teachers (See figure below). A successful movie is the one that can bring out many different levels of meanings to viewers so that populace can enjoy the gags whilst the critical reviewers can appreciate the dramatic conflict underlying the plot. In the case of the network, when teachers with different purposes in mind can all make sense of the network as what they expect, there will be benefit of more than fulfilling the customer delight of a large number of users. Even more importantly, a teacher who begins with a resource orientation can relate himself to the network from what he regards as important, and can then move on along the content to exploring new teaching ideas as a kind of personal development. In this way, more teachers are likely to identify with the value of the networks. Seldom of them will refuse from the
outset to try out the network for simply regarding it as useless to them.

Figure 6. Different teachers can see different meanings of a teacher network

More than this, there can be multiple entry points to teachers for them to get progressively involved and participate in their own affordable ways (c.f. Wenger, 1998; Lave & Wenger, 1991). Previous contributors may be given a chance to proceed to more a central role, such as becoming reviewers for the newly handed in teaching materials from other teachers, as depicted below. This is similar to the way that academic publication is done in research community.

Figure 7. Progressive engagement in a the teacher network

The two models do not mean to be exclusive from one another. But in fact with
limited resource, a network organizer should better subscribe to either one of them.

A Depth of Understanding about Using Technology in Education

- Implication to Teacher Educators

This study began with a more practical and pragmatic objective to find out the know-how’s of running a teacher network. However, over the period of the study, a more academic and intellectual research focus has emerged. This concerns the question of how different teachers go about understanding the purposes of using the technology in their practice of teaching, as a generalization from the specific uses of teacher networks. The investigating question has then shifted to what constitutes to a deeper and more meaningful understanding of using the technology in education. There is in itself a kind of “phenomenographic knowledge interest”. As Marton puts it, “There are reasons for carefully describing the qualitatively different ways of thinking about various phenomena (this represents the “phenomenographic knowledge interest”).” (Marton, 1988a, p. 180)

One of the reasons to fully describe the variation has an instructional implication. “A significant prerequisite for attempting to influence how people act in learning situations is to have a clear grasp of precisely how different people act.” (Marton & Säljö, 1984, p. 46) Introducing the different ways of thinking about the reasons of using the technology to teachers is an efficient way of enhancing the understanding of the teachers of why they have to use the technology. Teachers cannot only become aware of one’s own practice but can also reflect upon and realize the unexplored alternative ways that they may not have ever thought about before. In other words, the results of this study make teachers, as well as network organizers, more aware of their
options in the reasons to use the technology.

**Different Levels of Understanding Technology.** In what follows, I contrast two levels of teachers' understanding of the use of technology, which is in parallel with the continuity from a resource and a growth orientation, as suggested in the previous chapter. Simply put, at a more surface resource orientation level, there are teachers who regard the use of technology as a kind of symbol or trend that the merely act of using the technology is all that is needed. To a certain extreme, it does not matter much as long as the teaching materials are made more multimedia as one teacher said. On the contrary, at a deeper growth orientation level, the teachers are more skeptical and critical towards the use of technology. They try out the technology in the teaching as an exploration of new alternatives, which can enrich their repertoire of teaching approaches ultimately. As one teacher said, the most important thing is how teachers can effectively make use and incorporate the technology into their own practices of teaching.

Another example concerns the different ways that teachers use animation. There are teachers who use fancy and eye-catching animation merely to attract the attention of students, as the example mentioned in the previous chapter of using a national flag waving in the sky illustrates. Contrasting this, other teachers explore the same animation capability of the computers in hopes of helping students to visualize the unseeable and hard-to-imagine scientific phenomena. This kind of visualization is not only almost impossible to be done without computers. More importantly, in fact thinking up and imagining these scientific phenomena are believed to be the most difficult thing that students have difficulty in learning science; thus the animation is used in this way with an intention to foster a better understanding of the content.
Comparing the two cases, there are obviously different levels of the meaning of using animation from merely as a gimmick to actually helping the students to understand the subject content being taught.

Sometimes, it is impossible to give a clear-cut answer to the general question of whether the use of technology in teaching is effective or not. But in the latter case above, the teachers have clearly demonstrated a finer clarification and differentiation to the question, re-framing it to, in what situations the technology can be used in what way to make teaching more effective. This process of seeking meaning in the technology seems to have undergone from an undifferentiated and over general question of whether to use or not, to a deeper thinking of the conditions that suffice to enhance their teaching through the technology.

Technology Itself and What Technology Implies. A parallel of the above can be drawn to the difference between the sign and the signified in semiotic. Teachers with a resource orientation focus primarily on the tangible and obvious object of the physical computers or the resource on its own – the sign of the technology as such. The contrary of this is growth-oriented teachers, who instead see through the computers, apprehending the impact of the technology upon all other aspects of the whole process of teaching – what the technology signifies.

Narrowly focusing on the resource itself can be seen as a partial understanding of the whole idea of using technology in teaching. Apart from the technology as one part, it is of an utmost importance to connect and grasp the key relations between the technology and other aspects of the entire practice of teaching, including subject matters, instructional methods, teacher-student interaction and social organization in
schools, as depicted below.

![Diagram illustrating connections between subject content, instructional method, teaching materials & computer, teacher-student interaction, and social organization.](image)

**Figure 8(a).** Narrowly focus on the technology on its own

**Figure 8(b).** Connecting the technology to all other aspects in teaching

To further elaborate on this, I would raise the following questions to emphasize the connections between the technology and each of the other aspects respectively:

- Which part of the *subject content* would be taught more effectively with the use of technology?
- How could the various *instructional methods* that teachers have been practicing work in concert with using the technology in teaching?
- What would precisely be the changes to the *interaction* between teachers and students in the class?
- How could the *social organization* in schools be improved to facilitate the learning of students?

Teachers with a deeper understanding of technology tend to be constantly and regularly asking themselves all of the above questions.

This resembles the notion of *Systems Thinking* derived from the work of Senge in management thought. “All these events [the various aspects in teaching] are distant in time and space, and yet they are all connected within the same pattern. Each has an influence on the rest, an influence that is usually hidden from view. You can only
understand the system [of the practice of teaching] by contemplating the whole, not any individual part of the pattern… Instead, we tend to focus on snapshots of isolated parts of the system, and wonder why our deepest problems never seem to get solved.” (Senge, 1992, pp. 6-7) Similar to this, teachers with a growth orientation can see the interplay and the influence of the technology upon the many aspects in their teaching, whilst what resource-oriented teachers can see is only resources isolated and disconnected from the other aspects in teaching.

The approaches that teachers use to learn about using the technology in their teaching are also in accordance with the atomistic and holistic approaches adopted by students to understand a text in the early work of Svensson. “It is the difference between organizing the content into an organized whole or merely ordering and grouping parts.” (Svensson, 1984, p. 64) To put this another way, the most important thing is whether teachers can organize the technology with the other aspects of their teaching into an organized whole.

Central to all of the above is a depth of the understanding of the reasons for using the technology in teaching. As a contrasting example, common benchmarks in IT literacy usually assess learners according to the skills required throughout the different stages in using the technology. Examples are whether the learners have the ability to identify, organize, evaluate and apply the information, in each of these steps over the process. Perpendicular to this, the depth of understanding of technology should shed light on the teaching and assessment of IT literacy in a complementary way.
The Meaning of Technology
- Implication to Application Technologists

The present study can also be a pilot to the research on the people’s purposes of using technology across different domains. The study can be extended beyond the disciplinary boundary of the education field and can probably spark further interest in the research community of technology in general. Traditional research in technology emphasizes the know-how’s of solving a general problem in an optimal way. The more basic question of why people in the first place have to use technology is however seldom questioned, which is often regarded as axiomatic and undeserving of further research.

However, there are often non-obvious meanings of using the technology. A story of my personal experience can be an illustrative example. As I know, a large company has in recent years begun to use a computer system to automatically schedule the tasks of a large number of workers. When there was a less number of workers, the roster of the workers was done manually by the schedulers. However, there had been an unresolved problem for many years that some of the workers often sent precious gifts to the schedulers in order to influence them to assign a better task in favor of the workers. But beginning from the month that the system was launched, the schedulers can no longer receive any gifts from the workers. All of a sudden, the problem has been effortlessly solved since it is now the computer that determines the tasks of the workers in a purely rational way, rather than the schedulers. This example reveals an obscure meaning of using technology to enforce a fair allocation of resource, which is beyond the obvious and superficial meaning of data processing as described in every
introductory textbook about Information Systems. The authentic meaning of using technology may not be as simple as what one sees at first.

Replicating the present study to other domain areas can also challenge from an unconventional perspective the traditional belief of technology transfer, which is often considered as a direct application of the advanced and innovative technology from research to industry. Rather than this, the phenomenographic nature of the present study conversely sets out to theorize the practical experience of users in their actual practice of using technology. The meaning of using technology can be concretely studied across different context domains, such as business, medicine, engineering and so on. Among them, commonality and regularity in the purposes of using technology can be discerned out against the different context domains. This forms a basis to a new line of research, which can be labeled as “the meaning of technology”. 
CHAPTER 7

LIMITATIONS AND FURTHER RESEARCH

Limitation as a Pilot Study

The present research is only a pilot study that the data were collected from a small sample in size. When time allows, I would further to pursue this study by means of carrying out more interviews with teachers. There are at least two foci that I can consider. First, more teachers can be investigated to make sure the inclusion of all the different ways that teachers conceptualize their purposes of using the networks into the study. This provides a wider variation in the data, which can help to understand more deeply about the phenomenon of using teacher networks. Second, each teacher can be interviewed more than once. This can allow me to take a closer examination into the deeper beliefs of teachers. A longitudinal or developmental study can also be carried out to follow through some of the teachers to see how their understanding develops across the different purposes of using the technology. One interesting finding of this study is that teachers do not always fix at any one particular conception. Rather, teachers do not conceptualize the networks in the same way under different conditions. It is thus interesting to see how, and for what reasons, teachers change from one way to the others. Through interviewing more teachers and repeatedly interviewing the same teachers again, the findings of this pilot study can be more solidly substantiated.

Correlating the Results with Other Studies
Statistical methods can be also used to complement and enhance the present study in the way of providing a more accurate description of the results. Questionnaires\textsuperscript{4} can be administered to a large number of teachers in the schools to investigate their purposes of using the networks in a quantitative sense. In this way, a number of questions can be asked to verify the categories of description as found in this study. Do the five categories of purposes really form a continuum from one to the others? Would teachers with a certain category of purposes be more likely to hold any one of the other categories? What are precisely the ratios of teachers having each of the five categories of purposes? Beyond this, the results of the present study can also be correlated to other factors of the teachers so as to investigate the relations between the purposes of using the networks and some of the perceptions on work context or characteristics of the teachers. What kind of teachers is likely to have a certain purpose of using the networks? Does the holding of a growth orientation really correlate to the number of years of teaching experience as what I have sketchy shown in the preceding chapter? All of these can be confirmed through the use of statistical testing.

\textsuperscript{4} Since the present study is about networks, one may easily think of putting up a questionnaire on the web for teachers to fill in conveniently. But, I would rather prefer sending the questionnaires by post to schools for reasons concerning the sampling of subjects. Theoretically, using web-based questionnaires, a researcher cannot ensure an evenly randomized sampling of all the subjects. Rather, the sample subjects become the ones who take the initiative and decide whether to complete the questionnaires. In this way, the researcher can no longer enforce a representative sample of the subjects in the overall population. As such, administering questionnaires to schools by post should instead be used.
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Alexandria, Virginia: Association for Supervision and Curriculum Development.


Teacher Networks in Different Parts of the World

<table>
<thead>
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<td>教育部「學習加油站」網站</td>
<td><a href="http://content.edu.tw">http://content.edu.tw</a></td>
</tr>
<tr>
<td>亞卓市  EduCities</td>
<td><a href="http://www.educities.edu.tw">http://www.educities.edu.tw</a></td>
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<tr>
<td>全球華文網路教育中心</td>
<td><a href="http://edu.ocac.gov.tw">http://edu.ocac.gov.tw</a></td>
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<tr>
<td><strong>Singapore  新加坡</strong></td>
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<tr>
<td>Teachers' Network, Ministry of Education</td>
<td><a href="http://www1.moe.edu.sg/tn">http://www1.moe.edu.sg/tn</a></td>
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<tr>
<td>南洋理工大學中文網</td>
<td><a href="http://www.arts.nie.edu.sg/clc">http://www.arts.nie.edu.sg/clc</a></td>
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<tr>
<td><strong>England  英國</strong></td>
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<tr>
<td>National Grid For Learning</td>
<td><a href="http://www.ngfl.gov.uk">http://www.ngfl.gov.uk</a></td>
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</tbody>
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APPENDIX II

Interview Transcripts

<table>
<thead>
<tr>
<th>Sex</th>
<th>Subject</th>
<th>Seniority</th>
<th>School District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 1</td>
<td>F Commerce</td>
<td>Senior</td>
<td>Tuen Mun</td>
</tr>
<tr>
<td>Teacher 2</td>
<td>M Math., Computer</td>
<td>Junior</td>
<td>Tuen Mun</td>
</tr>
<tr>
<td>Teacher 3</td>
<td>M Integrated Science</td>
<td>Senior</td>
<td>Wong Tai Sin</td>
</tr>
<tr>
<td>Teacher 4</td>
<td>M Physics</td>
<td>Senior</td>
<td>North Point</td>
</tr>
<tr>
<td>Teacher 5</td>
<td>F Chinese</td>
<td>Senior</td>
<td>Yuen Long</td>
</tr>
<tr>
<td>Teacher 6</td>
<td>M Math</td>
<td>Junior</td>
<td>Tuen Mun</td>
</tr>
<tr>
<td>Teacher 7</td>
<td>M Computer</td>
<td>Junior</td>
<td>Tuen Mun</td>
</tr>
<tr>
<td>Teacher 8</td>
<td>M Econ. and Public Admin.</td>
<td>Junior</td>
<td>North Point</td>
</tr>
<tr>
<td>Teacher 9</td>
<td>M Chemistry</td>
<td>Senior</td>
<td>Aberdeen</td>
</tr>
<tr>
<td>Teacher 10</td>
<td>M Chinese History</td>
<td>Senior</td>
<td>Tseung Kwan O</td>
</tr>
</tbody>
</table>

The following is the transcription of one of the interviews with the teachers, which is served as an example to illustrate how interviews were conducted in this study. Other interview transcriptions are available upon request.
INTERVIEW TRANSCRIPTS

Teacher 5 - 女，中文科，資深老師。
日期：2001年2月28日
時間：下午4:00，約三十分鐘
地點：元朗

1. 研究員：剛才說，你沒有使用過我們的網絡，但就有使用 Cyber Campus 或者是 Edu-city。
2. 老師：我看過，就是瀏覽過。
3. 研究員：你覺得這些 ( 網 ) 有沒有用呢？
4. 老師：你說網站？有用，絕對有用。很短時間裡面，看到很多的資訊。有時我們，我還沒到用的階段，就只是去瀏覽，我覺得很多東西很 Interesting。譬如，我會想看的，譬如我做閱讀理解，看它有甚麼編章適合我，做閱讀理解。如何做教具。又有時是一些書目。總的是跟，我現在的做法是，看那些和我教學有關的，看那些和我教學有關的東西。
5. 研究員：有沒有一些具體的例子呢？
6. 老師：具體的例子？譬如最近我看過，我不記那個是，名稱是 ( 甚麼 )，是 I. Ed. 的，我 Click 進去看，入面就有不同的科目，再 Click 進自己的科目看看，它最主要是存錄很多老師，曾經做過的一些經驗，有些教學計劃那樣。
7. 研究員：怎樣的經驗，上課？
8. 老師：上課的，不，教案來的，是教案。另外，我自己也看過一個，港大的，是否你們呢？港大的，就有一個軟件，它引錄很多學校優秀的 IT 案例。
9. 研究員：CITE? 
10. 老師：對，CITE。我覺得很好，亦都對於老師來講，很輕便，看完錄像，也看完裡面的分析等，它也很清楚的把案例 Group 成幾個不同的 Models。老師來講，因為亦都是少，坊間沒有很多人講 IT 教學，會講 IT 的技術，但少講 IT 的教學。
11. 研究員：就是看一些教學法的？可以這樣講嗎？
12. 老師：Eh。對、對。
13. 研究員：或者怎樣實施一些...
14. 老師：怎樣實施一些資訊科技，因為，我覺得，有些人在學校裡面提倡的只是一些資訊，只是資訊科技這些，未必去到資訊科技與教學。
15. 研究員：實際怎樣把這些東西在課堂去應用。
16. 老師：對了，沒錯，沒錯。有時我會覺得，講 Power-Point，就好像 Power-Point 已經是資訊科技，我覺得問題不是這樣簡單。雖然，我對這個問題也不了解，但我覺資訊科技是絕不簡單，亦都不可以說，一套 Power-Point 就可以取代一個老師在課堂的地位。Click 兩張 Power-Point， 飛 飛 來東西出來，只不過是某些技倆，最主要的是，老師怎樣有效地去運用，再配合老師的其他手法一齊去用。
17. 研究員：這些你是在網上學到的？在 CITE 報告中學到的？
18. 老師：我想出來的，CITE 裡面，他只給你一個 Fact，這個是課業為本，他怎樣上課，有
教學分析。

19. 研究員：這樣問，其實，我想具體知道一些，例如，我們完成了一些東西，放在網上，有時就想，這些是否對老師有用呢？所以，我想知，例如一些具體的例，你會否有些經驗，試過，在這裡看這樣的東西，然後，帶回課堂去應用。

20. 老師：但是，很難說的，你說有沒有用，看這個老師教的是甚麼類型的學校。我舉個例，譬如，我最近都看過一個叫中文網，我不太 exactly 記得這個名稱，我 click 開裡面去看，裡面的東西是很難的，譬如，他講宋詞，講到很難，那些，我覺得不是我不教初中學校的小孩子適用的。for 我自己，休閒時間去看看，沒問題，但我又覺得這樣東西未必適用，但又不代表這些網有問題，這些網可能對其他學校老師沒問題吧。

21. 研究員：對，都是這樣想的。

22. 老師：所以，最重要是這個網的設計是給甚麼對象。多說兩句，就是我會覺得，不同的，中文網是給中文科去看的，但我回看中心，給不同的科目，所以，這個 scope 就不同。

23. 研究員：（那你最想看的內容是）

24. 老師：自己真的想看 IT 怎樣應到在課室裡面，可能是一些案例。其他，就是教學資源，譬如，剛才你們提到的那些，都很適用。我自己這樣看，又或者我對我同事的理解，會覺得同事都會適用，例如：試題庫、教材教具、工作紙，而且是方便到，隨時 download 下來，我改一改，fit 一下，就可以用得到。

25. 研究員：就是一些資源性的東西。

26. 老師：Hm Hm.

27. 研究員：（另外，）我們早前就做了一個問卷，就看到一個情形，就是老師就很想知道，其他學校的一些資訊。譬如，我問到為甚麼你會來我們的討論區，交流區的那樣。

28. 老師：交流區是網上的交流區嗎？

29. 研究員：對。看到的是，其實，幾多老師選的，就是想知道其他學校的一些資訊。那我想問的是，你想知道其他學校的資訊是一些甚麼呢？

30. 老師：這個都是重要的，所講的（應該）是一些經驗分享和交流。有時，現在我都覺得，外面坊間去組織工作坊或者講座，一個比較明顯的現象是他們要求老師出來講，可能某些學校，他某些 feature 很明顯的，譬如，某些 development 搞得很好的，課程上處理得很好，然後跟大家分享。我自己都覺得有時不是可以整套移植到自己學校的，但可以 stimulate，我都覺得 stimulation 很重要。我猜刚才你說，那些老師可能期望的，不是基於一個八卦的層面，你學校在做甚麼，就是期望有一些新的看法。

31. 研究員：這個會不會跟你刚才說的個案類似呢？就是交流也是想每所學校它的模式。

32. 老師：不同。那樣是我看一個 model，我不會開心那個老師來自哪一所學校，哪一班是哪一所學校的學生，我不會理會那所學校在做怎麼，我單單在教學法那裡看看，那個教學法，可以這樣用 it。就以那套軟件來說，它的 purpose 不是這樣。我又覺得在網上面，其實，我沒有這個經驗，我沒有試過在網上面，類似平臺區，公開討論，我就沒試過這個經驗，所以，我很難在這裡講想怎樣。

33. 研究員：不過，我覺得這並不是一個問題，網只是一個手段而已，反而，可能是一個工作坊，工作坊的形式去搞一個交流，然後，把一些資料放回去，我覺得不一定在網上的。
老師：但，這個網會不會很難做到這方面的交流，就是我想，譬如，我寫一些感受式的，可能容易寫，按著你的感受的一些回應。但你說，更加深層次的，我想討論教學法都可以的，我想教學法都可以在這個平台，但你說，更加深層次，理解這件事怎樣在學校發展，怎樣成長，怎樣發揚光大，我覺得，不知道，不知道網是否一個適合的媒體，我這樣想。

研究員：我都同意，狹窄了很多。

老師：對嗎？

研究員：不然的話，我也不用親身來。

老師：對，和你在打一個網都可以，但這就不是那樣了。

研究員：這樣講的話，就可能是辦一些工作坊，面對面的一些交流，這就比較容易。

老師：Hm。提一提，這個可能是小問題，那些介面其實都盡可能是簡單，就是不要太過複雜，盡可能是 User Friendly，Click 進去可以看到想看的東西，或者（有些）Click 進去看另一樣的東西，或者要找其他的，怎至乎有關很 Confuse 的，兩樣都對的，我都不知道選哪一個。

研究員：其實，你都很熟識，你問這樣問都，你都很常用。

老師：都常用的。

研究員：其實，你用得（頻次）多嗎？多久呢？

老師：經常，每天都會開。

研究員：你除了教中文以外，也教怎樣科呢？

老師：我教德育科，但我主要教中文科。

研究員：但會不會用網去找一些教材呢？

老師：我會去看，但我就沒製作過一些教具出來，除了交給教署的功課之外。

研究員：BIT 那些。

老師：BIT，IIT 那些。

研究員：很有趣，都很特別的，其實，你的做法是，這些都是參考來的。

老師：當然。

研究員：但你（頻次）都挺（密）的，你每天都。

老師：我其實，可以這樣講，我自己看我在 IT 方面的成長。就是說，我現在仍然在很低的層次，告訴你，我中文倉頡（輸入法）也不會，我就靠一個手寫板，我要手寫板的。

研究員：這個不是問題，我覺得。

老師：但是，我覺這個是開始，我不會因為我不懂倉頡，所以 Handicap 在電腦裡，但我也會覺得，我自己的成長，就是說在 Explore，很多老師，我想很多老師，因為 IT 來得太過急了，小兒子學東西比我們學得更快，他們已經在學寫網站，寫網頁了。我們 Upgrade 不夠小孩子快，所以，這個時候很多老師都是 Explore 的階段，包括我自己，我 Explore 的階段要看這個，看看那個，才找到這個 Choice 在哪裡，然後才 Develop 自己的一套，應該會是這樣，所以，現在，你會奇怪，我只是在看，看到適用的，我也會 Download，但是，還未到真的進入課室，但這個一定是重要的，一定，看了以後進課室，這個才是 Ultimate goal，我的看法。
研究員：那你（會看哪一些網頁）呢？

老師：看 Email，Email，每天 Check 一次。還會看...Special 的看哪一個站，ASCD，ASCD
就是 Curriculum 的一個網站。看看有沒有一些新書出版，看看它的 Journal。我也會看教
署那個，教署那個，看看有甚麼教職員培訓。

研究員：Edu-city 那些？

老師：不，Government 那個。反而，那個資訊教育城，我看過一次，我猜裡面很好的，我
沒有長時間去 Study 它。

研究員：它的印象你覺得是怎樣呢？

老師：印象，我看，很多東西吧，它好像很豐富的，但我又覺得，我試過 Click 進出，
覺得，原來都是這樣而已，它開了很多項出來，但每一項都是這樣表面而已，我想要時
間 Build up，我想他們，但這個是好現象來的。其實，你們要做，老實說，講起教署那個，
我會覺得，其實最主要是，可以 Build up 中心的特式，因為，其實網站都很多，我刚才
也問這個問題，就是說，你們的網跟 ASCD 那個，有甚麼分別呢？教署的也很相象，好像甚麼都有觸及。

研究員：其實，我們的想法都不能 Compare 的，Edu-city 那個，就跟你說，好像每科都有，
好像很多東西的，我們的目的也不一定是這樣，我們做主題式的，好像，譬如，提升老
師中文，例如擬題那樣，這是很具體一樣東西，這個為主線，然後網、工作坊，很多東
西的，就是我們會是這樣，所以，其實分別就可能是這樣，可能不是這麼多項，但那一、
兩項，我們希望能夠做得深入一些。整個想法是這樣吧。

老師：Hm，hmm，對。

研究員：你使我想起一些東西，你有看這些網，譬如一些教學的網頁，你會不會因為這個
原因，你有沒有學什麼新的？

老師：有甚麼學習？譬如我們上課都要做，帶一些小朋友的 Major，比按一本書教更重要，
老師都會想想，用不同的方法去處理這個課堂，現在就是多了一個電腦的選擇，我覺得
教學選擇上面是多了。

研究員：你的“選擇”是甚麼選擇呢？

老師：手法上面的選擇，我猜裡面的變化仍然需要人去 Explore 多些，因為我想大家仍然
在掌握技術的階段。

研究員：你說大家老師都在...

老師：我猜是。掌握技術的階段，掌握了之後，其實怎樣去變化呢？這個仍然有很多空間。

研究員：如果回到一個網去講，你想看的是一些個案，就是一些示範的手法，就是想多看
這些例子，想去 Explore。

老師：Hm，hm。其實，你說，是不是每一個網站都好好呢？現在坊間，我覺得不是。我也不
清楚自己的需要在哪裡，按著網站來說，有甚麼就看甚麼，我暫時未有 Idea。

研究員：就你所教的科目，你覺得最難是甚麼呢？學生永遠都掌握不了的。

老師：教學上面的困難？怎樣說呢？這個問題其實是，如果我們回看我們的小孩子的
Nature，其實就他們比較程度抵的。但問題就是說，看我們的（小孩子），不一定同一時
間可以接收這麼多。譬如，我們說教中文，我們講教學欣賞等等，在某些層面，其實，
不一定 Apply，在這個階段，不一定可以 Apply 到這班小孩子。可能有時我們處理課堂的
時候，我就需要看看，我要（講出）這個課文的哪一個點。這裡，我覺得，有時候，自
己也會比較貪心，會教多了，小孩不一定能接受到。所以，在教材的篩選那裡。一篇課
文，我怎樣去教呢？我教些甚麼呢？這最重要。
75. 研究員：這個就是在一篇課文，找出它的重點出來。
76. 老師：對，找到重點了，一課書可以教很多樣東西，我只可以找一樣東西來教，這樣東西，
我怎樣去向學生演繹呢？使用甚麼手法來演繹呢？其實，這些都要花很多的時間，而且，
很奇怪一件事情，我教同一班學生，在我教學經驗裡面，我教同一班學生，可能今天我
可以用這個手法，明天去教同一班學生可能不行，這樣就要去換，就是這個變化是快到，
講教學的變化，這個變化需要快到，即時在課堂上看甚麼樣的情況，用甚麼去變化。問
題就在這裡。所以，就老師的 Exposure 都很重要。
77. 研究員：你說的 Exposure 是甚麼呢？
78. 老師：包括是教學手法，對小孩子的了解。
79. 研究員：我們怎樣去 Promote 交流的其中一個手法是，找出最多人問的問題，找個機會去
組織一班老師，大家討論一個 Particular 的問題。
80. 老師：對了。例如舉一個例子，你們做過的玩具工作坊，我那時也不知道是你們辦的，我
覺得這些是相當有趣的題目，就算你說擬寫試題，這些在坊間，他們討論大問題，如何
提升學生的動機？課改、教改，很 General。
81. 研究員：具體地怎樣去做。
82. 老師：對了，可以搞的是在一些小的 Topic 上面，Specific 的題目，去 Elaborate 多一點，
但我也會提出，在宣傳上面，其實，今天的面談很好，走出了第一步，在宣傳上面仍可
以多做很多。譬如，（在這）之前，我知道你們搞過 ● 創意 ●，其實，這些都是一些很好的
Topic，其實，真的可以再推廣一些。
83. 研究員：你覺得，如果找一班老師出來討論這樣一個 Topic，有沒有效呢？又或者（怎樣
做）你會覺得（比較好）。就如你說中文科怎樣去找適合的材料，怎樣去選擇材料適合自
己的學生？可以怎樣做呢？
84. 老師：提出題目出來一起討論。
85. 研究員：你會不會還想起其他的方法呢？
86. 老師：我真的不知道，如果，我理解中心可能是一個支援的角色，特別是支援一些 EMI 學
校，EMI 轉去 CMI 的學校。我的理解是這樣，這個正正是你們生存，可不可以這樣說，
比較特色的位置，亦都是在這個 moment，這個時空裡面。我看這個也是有需要去做，但
我就會看，其實，有時候，我都會覺得，講一些 Specific 的 Topic，真的可以多做一點。
剛才我想起一點，但又忘了…
87. 研究員：你說某一個 Topic 也可以做的。
化沙龍，好像沙龍的形式，刚才你說的，凝聚一些中文科老師按一些特定的小 Specific Topic 去討論，這樣，我覺得這樣可以多做的，有時也不一定要大形的，二、三百人坐在一起，聽 Seminar 那樣，也不一定是工作坊。其實，這個是可以做的，我知道，我聽一些前輩說，早年這個在香港是幾流行的，例如語文學會，地理學會等。我覺得這些是可以做的。

研究員：（你知不知道他們是怎樣去做的呢？）

老師：以我所知，真的好像是一個小 Topic，講教育政策，教育眼，定期有些聚會，聚會不一定是自己討論的，可能有些行山，遠足，一些聚餐，定期都有些 Specific Topic 討論，因為，參加的都是一些有份量的人，使大家的 Stimulation 很好，可能大家聚在一起彼此交流，對教育政策的看法。不 Formal 的，很 Casual 的。

研究員：就是要這樣的情形才可以討論。反而，你很 Formal 的話，就很難去談，只有你聽他說的，但我覺得不是這樣（Formal），其實，交流是一個很 Specific，informal 的，互相刺激。

老師：我覺得以中心現在的發展，其實，我真的不理解，可能會講錯。我覺得如果能夠做到這樣，其實已經不錯了。再發揚光大，我在一所 CMI 學校，可能不一定是最好你們的 Target 學校，但 Anyway，這個是有一個空間的，盡量凝聚一些學校裡面，就是多取一些 Funding 來做，我的看法是這樣。

研究員：或多問一個問題。（你會怎樣去提升自己呢？）

老師：有硬性的，軟性的就是多看書，有時候，我都喜歡在教學的層面，我指在學校裡面工作，因為，其實，有些東西是幾貼身的，即教署下來的很多教材套，很多 Circulars，很多，感覺和外面很接近。我會覺得，老師可以在這方面，多些去聽 Seminar，去聽。硬性的就是多些去讀書，即是循序漸進的去讀書。可以很坦白的跟你說，其實，我自己，我一直教書，我沒有做過其他工作，畢業就教書，我一貫以來做的，其實，你說就中文裡面去鑽研，其實，我不多，反而，在 Education 方面，做的東西。中文我覺得，可能中文有很多東西我不懂，但我會覺得，我拿著這個知識，其實，最重要是這東西怎樣 Apply 在我的學生上，這樣就 Education。而且，我自己都會傾向，我自己認 Special Education 的，很早期我自己的性向都會返回 Special Education，雖然我在這所學校裡面教。我自己的看法是，我自己的傾向是，多學些 Special Education，現在，我不是教弱智學校，但 Special Education 內裡有時講到的一些問題，其實是很觸及教育的核心的，例如，怎樣去看一個學生。這些 Concepts 其實，我是在 Special Education 內裡去接觸的。

研究員：或者我講講，為甚麼問這個問題。我們在想，其實，有甚麼，我們可以幫老師提升自己。你這樣說，最主要都是 Formal training。

老師：我說我自己而已。但我對一般同事的理解，或者我對學校的理解。其實，我在學校裡面，我也是做 Training，做 Staff development。我自己 Training 的方法，其實，自己的傾向是，聽 Seminar，講 Exposure，和怎樣去掌握那個變革，那個命脈，這樣東西，一定是在一些大的場合裡面，同事去慢慢揣摩和掌握，這個是必然的。但我自己的看法就是，同事最需要的是甚麼呢？就是怎樣可以令他們可以在課室裡面 Survive 特別是教小孩子，可能他反應慢一點，他的教學手法平淡一點，可能已經不能夠 Survive。所以，教學手法
是最要的。教他怎樣去教，教他怎樣去教。而且，我們講變化，變化都要有基礎，基礎就是我掌握到 A，B，C，D，E，然後才可以有更多板斧我可以變，今天 A 不行，我用 C，C 不行，我用 D。就是要在這個層面，我教完了 A，B，C，D，E，然後，你靈活運用去選擇怎樣去用。然後，你再去創（新），X，Y，Z 出來。所以，在老師的層面，老師是需要，我只是講我這所學校，不代表其他學校，一些很 Concrete 的，教學怎樣去做，那是我可以在我教學上面運用的，就是這樣。

99. 研究員：譬如說「玩具教學」，你是不是想看一些例子，例如這個就是你的 A 了。
100. 老師：對，對。這個階段，我就是在做這件事情。
101. 研究員：又例如你剛才講 CITE 的那幾個 Models，可能就是你的 B，C，D，E。
102. 老師：對了。這個東西，我可以放在口袋裡面，我可以，有需要就用，沒有需要，就作為增長我的知識。
103. 研究員：我們三月有一個魔術教學。
104. 老師：Good，好。好，好，好。是不是 Subject based 的呢？
105. 研究員：就是看他方法。
106. 老師：不要緊，很好。
107. 研究員：差不多了，好，謝謝你。