

Analysing Teachers' Expertise, Resources And Collective Work Throughout Chinese And French Windows

Análise dos professores competências, recursos e trabalho coletivo no contexto chinês e francês

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ABSTRACT

The working culture in Mainland China has been described as collective (Yang, 2010). Learning community is claimed not only in students' learning but also in teacher professional development. As a main and key form of teacher professional learning community, Teaching Research Group (TRG) is considered as a basic non-administrative organization (Hu & Wang, 2014), which combines teaching, scientific research and daily management into an integral whole, started since 1957. In February 2014, an interview with three Chinese mathematic teachers was conducted for a preliminary study of the author's PhD thesis aiming to compare Mathematics Teachers' Documentation Work (Gueudet, Pepin & Trouche, 2012) in China and France, focusing on Teaching Resources of Advanced Teachers. This presentation will focus on teacher's teaching research group based on not only the interview data, but also some academic and official documents as references.

Keywords: *teacher professional development; teaching research group, TRG; China.*

RESUMO

A cultura de trabalho na China tem sido descrita como coletivo (Yang, 2010). Comunidade de aprendizagem é reivindicada não apenas na aprendizagem dos alunos, mas também no desenvolvimento profissional do professor. Como uma forma principal e essencial de comunidade de aprendizagem profissional do professor; Grupo de Pesquisa em Ensino (TRG, sigla do termo em inglês) é considerado como uma organização básica e não administrativa (Hu & Wang,

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2014), que combina ensino, pesquisa científica e gestão diária como um todo integral, desde 1957. Em fevereiro de 2014, em uma entrevista realizada com três professores de Matemática chineses foi realizada como um estudo preliminar de tese de doutorado da autora, com o objetivo de comparar o trabalho de documentação dos professores de matemática (Gueudet, Pepin & Trouche, 2012) na China e na France, enfocando os recursos de ensino de professores experientes. Este artigo irá focar em professores do Grupo de Pesquisa em Ensino baseando-se não só os dados de entrevista, mas também alguns documentos acadêmicos e oficiais como referências.

Palavras-chave: *Desenvolvimento profissional do professor; Grupo de Ensino Pesquisa; China.*

Introduction

With the frequent good performance of Chinese students achieved in several international tests, Chinese mathematics education has attracted much attention from the world. Compared with teachers in developed countries, Chinese mathematics teachers lagged far away in terms of academic qualifications. As a national survey (Ding et al., 2010) about teacher professional development in primary and secondary schools showed, among the huge quantity of teachers, only 0.8% of Chinese teachers have a master degree, while in United States, it is 50% (Wang, 2013), 55.7% of the teachers have university diploma, but only 17.3% of them have the bachelor degree, which means almost 2/3 teachers gain their university diploma via in-service training but not formal and full-time higher education. Although after having received compensatory education and achieved higher academic credentials, Chinese mathematics teachers still lag behind their counterparts in developed countries in terms of academic qualifications. However, research (Ma, 1999) shows that Chinese mathematics teachers have a deep understanding of basic mathematics and a good command of pedagogical content knowledge (PCK). Several studies showed that, Chinese teachers' good performances are quite close with some efficient school-based means (An, Kulm, & Wu, 2004; Li & Huang, 2008). They gain a deep understanding of basic mathematics and adequate pedagogical content knowledge (PCK) through the activities of Teaching Research Group (TRG), which help them obtain practice knowledge and achieve in-service professional development (Yang, et al., 2013).

As a basic organization for teachers' daily activities, what is TRG? Where does it come from and how is it developed? What do teachers do in TRGs? With these questions, this study will try to provide a detailed introduction of TRG.

TRG and its cultural background

In East Asian region, including China, it is believed that all teachers can teach if they are properly trained and guided (Lee, 1998), which is quite similar to the Chinese ideas in an old saying goes “diligence can remedy mediocrity” (勤能补拙). Working collectively, in China, is a culture, which can be traced back to Confucius: “Whenever walking in a company of several persons, there among them must be someone worth learning from” (“三人行，必有我师”). From the view of culture, the school level working culture in China has been described as collective (Yang, 2010).

In Chinese schools, students are organized by age into grades, and study three core subjects: the Chinese language, the English language, and mathematics. Unless the West, Chinese students form class cohorts that stay together in the same classroom throughout the day, visited by their various teachers. Most of the Chinese teachers that teach the core subjects generally only teach one subject two or three times a day, and they are all full time service teachers in school. All these above provide conditions and convenience for organizing TRGs.

Another direct reason for breeding TRG is the influence of the former Soviet Union, which was based on the commune model, with an emphasis on enhancing school-based teachers' professional development through collective effort (Lin, 2008). In the western countries, the prototype of the teacher is a person with individual responsibility to teach a number of classes (Winsløw, 2012), culturally to see, Chinese teachers welcome visitors to their classrooms, and they regard it as an honor to present an open class (Wang, 2013), working collectively has been described as a working culture and atmosphere in China; while institutionally to analysis, Chinese students form class cohorts that stay together in the same classroom throughout the day, visited by their various teachers,

since most of the Chinese teachers of mathematics, Chinese or English teach only one subject twice or three times a day, these core-subject teachers easily organize into subject-specific TRGs. A mathematical TRG therefore exists in every school. Figure 1 shows the structure of current teaching research system. In 1956, Teaching Research Office started to be established at the district/county, city, and provincial/municipal levels under the corresponding government education departments (Lin, 2008; Yang, 2009; Yang & Ricks, 2013). TRG is a basic unit for teachers' activities. In most middle schools, especially large-size ones, Lesson Preparation Group (LPG) appears as sub-organization of TRG, in which teachers can study the curriculum materials, make lesson plans together and share teaching experiences (Yang & Ricks, 2013).

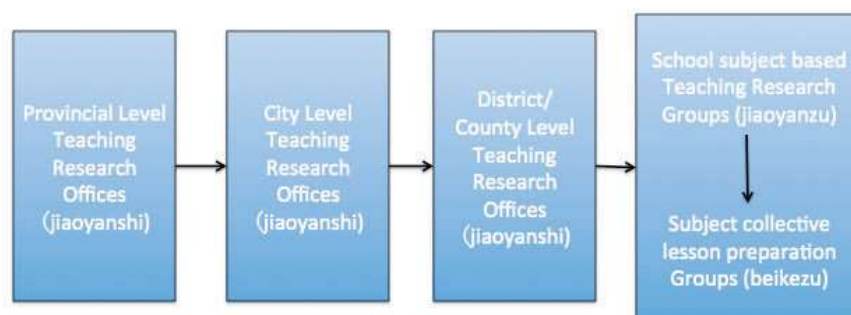


Figure 1. Structure of teaching research system in Mainland China

The main functions of this teaching research system is to help education department at the various levels enact relevant policy documents, organized seminars for teachers from the district to learn the curriculum framework and teaching syllabus, study teaching material and teaching methods, and exchange teaching experiences. What's more, the TROs also organize regular subject-based teaching contest, which are well-organized formal professional activities (Huang et al., 2010), for in-service teachers and novice teachers, providing them a “concentrated opportunity to learn” and a chance to work on “basic teaching skills” (Paine et al., 2003).

TRG and its prelife

Chinese educational system was influenced greatly by Soviets since 1950. The word of “TRG” was firstly announced in 1952, “teaching research groups should be set up in all subjects in secondary schools”, with the duty of “to study and improve the way of teaching”, cultivating large amount of teachers to meet the demand of rebuilding schools after wars. As the rulebook emphasized by the China ministry of Education (MOE, 1957), TRG is not an administrative department, the leader of TRG is not an administrative cadre, and the task of TRG is organizing teachers to do teaching research, and improving the quality of education. But the property of TGR has remained arguable for a long time: due to the unbalanced development of schools and teachers in different regions in China, TRG was actually be set in a condition which has very limited resources to set up such a professional principle-based teaching and research organization. At the beginning of People’s Republic of China, in many primary schools, one teacher in charging several classes or grades was a quite often phenomenon. So the TRGs always shared responsibilities for some administration work. With the rapid development of the population after 1990, especially in large cities, TRG began to be much more formal and normative. Since TRG is a basic unit for teachers’ collective work, once a teacher start to work in a school, she will belong to a specific TRG in the discipline she teaches. As the division of labour subdivided, within each TRG, a specific group named “Lesson Preparation Group” which consists of teachers from the same discipline in the same grade, focus more on affairs about daily teaching. Meanwhile, the administrative works of TRG begin to be moved to “Grades Group”, which contains all teachers come from the same grade. Grades Group born as an administrative organization, and Head teacher Committee which was formed by the head teachers who are in charge of classroom management work also spared some trivial stuffs from TRG. Figure 2 shows the school administrative structure since 1980s.

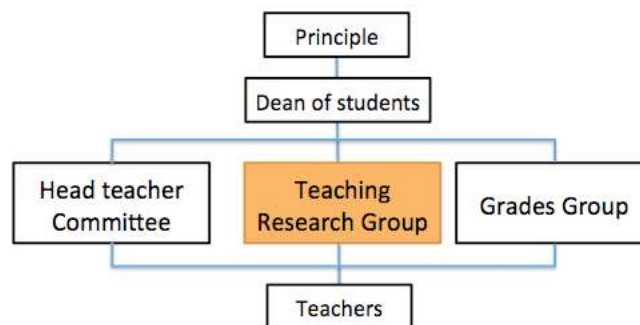


Figure 2. Structure of the school administrative graph since 1980s

From the 1980s, a trend that teachers from primary and secondary schools participate in education research raised throughout China. The education administration department built a set of education research management system, including a management procedure of “selecting topics, proposal, project approval, medium-term inspection, final project report, expert review and education research achievements evaluation” (Chen, 2006).

Since 1990’s curriculum reform, TRG began to take the responsibility of carrying out post-1990 curriculum reform, “Teaching research units of schools need to center on the basic education curriculum reform, fill its functions of researching, guiding, and serving ” (MOE, 1990).

In 2001, “the TRG at all levels should actively participate in editing textbooks and conducting teaching experiments of basic educational reform, to learn from other nation’s experience, and to promote the excellent experience on teaching in basic educational reform”(State Council, 2001). By encouraged to participate into the curriculum reforms, the work of TRG slowly gained the research part. But most of the school-based TRGs still focus on school-based teaching research activities and serve as China’s conduit for helping teachers to efficiently implement educational reform (Yang, & Ricks, 2013). During 1990s to 2000s, school-based TRGs focused on school-based teaching research activities and serves as China’s conduit for helping teachers to efficiently implement educational reform.

In 2003, the Basic Education Division of Ministry of Education start a program called “School-based Study” to improve the traditional research and engaging the teachers into curriculum reforms. From 2004, with the selection and guidance of the program’s Expert Group (formed with participation from 30 provincial education research centers and 16 normal universities), the first 84 school-based study sites were approved and specific program plans were made. During the following years, the number of school-based study sites greatly increased with the supports of TROs at all levels. Since then, the School-based Study program has been promoted all over the country, and a more formal, professional relationship between schools and universities formed (Wang & Gu, 2007).

TRG and its activities

Originally envisioned as a collaborative means to improve teaching, the School-based Study System has gradually evolved over its history into a powerful school based form of professional development for implementing curriculum reform (Yang, 2009). The new approach of the school-based study system has greatly influence traditional TRG activities in recent years.

Up to now, the main jobs of TRG can be separated into two parts: the regular work as before, including knowledge and professional learning, collective lesson preparation and Chinese lesson study; and the various education research projects and studies. In detail, the current school-based study activities include: (1) helping teachers move from skill-based lecturing pedagogies to a more cultural, ecological pedagogy; (2) shifting attention from textbooks and traditional instruction approaches to teacher-student interaction and verifying student learning in the classrooms; (3) creating a learning atmosphere in the classroom instead of preparing for examinations with routine lesson activities; and (4) promoting collaboration beyond sharing teaching experience to emphasizing new study ideas and methods (Yang, 2010).

Collective lesson preparation and open class

Lesson preparation generally infers that teachers prepare lessons individually. Due to the historical reasons, collective lesson preparation appeared in order to make advanced teachers mentor those teachers who

need help. In this way, collective lesson preparation, to some extent, improves communications and exchanges among experienced teachers and novices, which is considered as a core activity in TRG. Open class appeared to be example lessons in 1950s, namely teachers give lessons in public, aiming to provide models for teacher students or in-service teachers. When adding the parts of evaluation and comments on lessons after class, open class becomes a lesson study, which contains giving lessons, lesson observation and lesson discussion seminar after class.

Research projects and special topics seminars

According to the documents in 1957, TRG was set as a teacher collective learning organization to improve teaching quality, which has very few “research” elements. The exchanges and communications among teachers mainly based on teaching experiences, which relies much on individual feels and shortage of subjective evaluation standards and theoretical reflections. Since 1990s, impacted by the trends of the new curriculum and education researches, research projects demand teachers to summarize some ideas or value orientation from their teaching experiences, conduct the project in an established research procedure which demands for theories to guide the research process and support the research results, and meanwhile instructed, supervised and motivated by the research management institutes, the whole process “at least, providing teachers some trainings in research” (Chen, 2006).

Operation mode of TRG and example of chinese lesson study

The operation mode of TRG in China was influenced deeply by Soviet. The activities in TRG can be sorted into two types: task-based activities and diagnosis-based activities.

Task-based activities hold a main part of TRG activities, such as collective lesson preparation and open class, which contains “tasks assigning - preparing separately - combining collectively - tasks accomplish”, as shown below in Figure 3 (Hu, Wang, 2014). Most of task-based activities are presented through a set of teaching management methods, which means although there are some study and discussion elements, task-based activities turn to be more administrative and instructional. Accomplishing tasks collectively is the main advantage, as

well as the arguable part, of task-based activity. It focuses on the tasks and objects, but ignores the individual ideas and preparations.

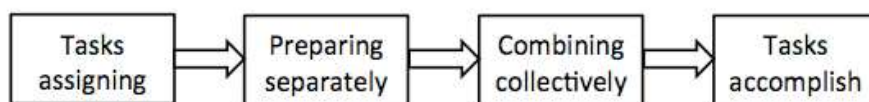


Figure 3. Operation mode of task-based activity

Diagnose-based activities are not so widespread in TRG practice, but it is quite beneficial for teacher teaching practice. “Diagnose” comes from the medicine field, focusing on specific problems. The procedure can be seen in figure 4.

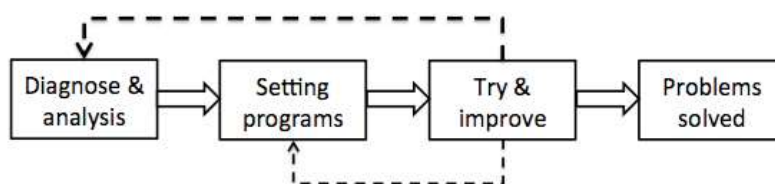


Figure 4. Operation mode of diagnose-based activity

Chinese lesson study can be a typical diagnose-based operation mode. The detailed process of lesson study is: (1) a teacher communicates in TRG about a problem rising from her teaching practice; (2) with the help of colleagues, the teacher gets the preliminary problem solving programs; (3) the teacher applies the program into reality; (4) with the carried out results, the teacher reports and discusses with his colleagues again; (5) they diagnose the result and make a new improved program; (6) the teacher carries out the new programs in practice... There is no ending until the problem solved. During the process of diagnose-based activities, what TRG focuses most are the problems raising from teaching, the object is finding the reasons and the methods for the problem, and getting reflective ideas in the end.

Figure 5 and Figure 6 show an example of diagnose-based activity in a middle school in Shanghai, China, 9th January 2015.



Figure 5. Lesson observation



Figure 6. Discussion seminar after class

Two report open classes were conducted by 2 mathematics teachers, who worked on a project named “Implement Group Work as a form of student organization and learning mathematics ” (in this school, group work in mathematics classroom teaching was not so often used). Before that, during the past semester, the two teachers were guided to explore the methods to adapt the group work into the classroom teaching, they tried and verified time and again, and made a report open class respectively in the end of the semester. The discussion seminar was chaired by the head of school, the teachers who gives the lessons, teacher A and teacher B, made a self-report and self-evaluation first, explaining their lesson projects and plans, their reflexive ideas and questions of their lessons, then other members made some comments and suggestions, such as “the pace or the time management of the lesson should be better controlled”, “the goal or the key points of the lesson are not so focused” etc. Also they shared their own experiences and puzzles about this project, such as how to make the students concentrate on learning. During the discussion, the leader and advisor of the project also contribute to the discussion.

A PhD project based on teachers’ collective work

A PhD research project named “Tracing Expert Teachers’ Teaching Resources: A Comparative Case Study of Mathematic Teachers’ Collective Documentation Work between China and France“, started in 2014, aims to explore advanced teachers’ teaching expertise through their collective work resources. This project comes from a cross part of two projects: the ReVEA project in France (<http://anr-revea.fr>), which studies the resources for teaching and learning, and also collective resources;

and the CORE-M project between France and China (<http://joriss.ens-lyon.fr>), which is particularly related to the collective and resources for mathematics teaching in a comparative aspect between China and France. This study is firstly grounded in the documentational approach to didactics (Gueudet & Trouche 2009). It considers essentially teachers activity as a work with a wide range of resources, collecting, selecting, combining, sharing, implementing and revising them, constituting so a 'resource system'. For analyzing this resource system, this approach proposes a reflective investigation, namely the teacher will be involved to this inquiry. It develops several tools in this perspective: for examples a logbook, or a Schematic Representation of her Resource System (SRRS), where a teacher is asked to draw her resource system, corresponding to her diverse kinds of activities.

Designed as a case study, two mathematic teachers deeply involved in collective work, from two middle schools, one in Shanghai (China) and one in Lyon (France) will be chose as main terrains for a close follow-up. Their two schools need to share some essential features: being well equipped in ICT instruments to guarantee sufficient opportunities for teachers' access to resources, hosting an active TRG (resp. LÉA) and having direct collaborations with the research institutes (IFÉ/ECNU) to get better supports for the study. The two teachers need to have rich working experience in TRG/LÉA. Before the follow-up of the two collectives, the roles and jobs of the teachers (both their general school work in TRG/LÉA and works in other collectives) will be investigated. Taking opportunities delivering teachers expertise in documentation work, such as the coming French curricular reform in September 2016, the teacher's activities related to a given topic will be followed: the aim of the activity; the task of the teacher; the resource produced. The data will be collected through (1) group messages (e.g. emails) in the collective, (2) resource shared in common folders (e.g. dropbox or paper documents), and (3) resource prepared by the teacher for the targeted activities. Considering triangulation methodology, two teachers of the main terrains, who have close interactions or cooperation (especially on resources) with them, will be followed in the same way. Due to the impossibility of following face to face in the same time in China and France, a set of distant follow-up tools will be prepared: a shared online folder to follow the resource exchanged and produced; a reflective logbook for the activity (written by the teacher); a regular communication (call/Skype/email) for interviews.

A pilot study in China, 2014

In February 2014, a pilot study, with three advanced mathematic teachers (Jiang, Ji and Zhang) with different working years (resp. 8, 18, 23), who come from a same high school but belongs to different TRGs, was conducted in China, using a 6-month's observation and two sets of in-depth semi-structured interviews on their work/resource environments, collective work experiences, and the way they develop their expertise. Figure 7 shows one of the SRRSs (teacher-draw), in which Jiang showed his powerful online resources. We analyzed the structure of SRRSs with their corresponding explanations, and the frequency of the words about resources mentioned in their interviews.

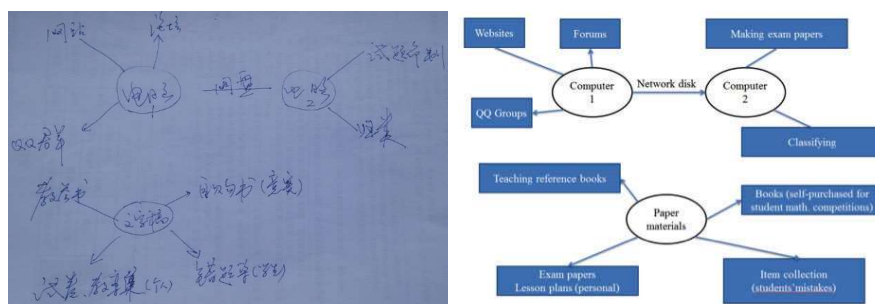


Figure 7. SRRS of Jiang (8 years)

This analysis evidences structural common features of teacher expertise, combining kinds of resources and resting on collective work (TRG as well as online discussion groups). But “despite these similarities, the three teachers had very different resource systems: Zhang’s system was highly structured; Ji’s more distributed; Jiang’s structured and focused on IT/networks” (Pepin et al., submitted), teacher’s expertise appearing to develop with the structuration of his resource system. Teacher expertise is developed intervened with their resource systems, also grounding from the collectives they often participate in, namely TRG.

The next step following-up from 2015

Chosen as a comparable collective as TRG, LÉA in France is a network developed by Institut français de l’éducation (IFÉ, <http://>

IFÉ.ens-lyon.fr/IFÉ) in 2011, aiming to build an explicit association between schools and research institutes, to gain resources and better understanding from interactions between teachers and researchers. To be a LéA, teachers of a given school need to propose a critical question arising from their teaching practice, they need to be strongly supported by their administrative staff and to meet the interest of research of a team in IFÉ. Then the school and this team will submit a joint project to IFÉ. Once they get the qualification, they engaged (mostly 3 years) with IFÉ. LéA's short history doesn't mean that the collective work among teachers in France is recent. Actually, before LéA, the Instituts de Recherche sur l'Enseignement des Mathématiques (IREM), gathering teachers and researchers, have existed since 1968, and the teachers collective work origin can be traced back to 1900, the French Dictionary of Pedagogy (Buisson, 1911) defining “teaching as collaborating”.

During April to July 2015, a 3-month's preliminary follow-up of Anna, a French mathematics middle school teacher, was conducted in Lyon. The follow-up includes the classroom teaching in one of her Grade 6 classes, in-service teacher trainings, pre-service teacher mentoring, and school meetings with her colleagues, all the collective activities she conducted inside her school. The resources she used for activities were shared with us (two PhD students) in a dropbox that we name here *RI box* (reflective investigation dropbox, proposed by Anna, for providing roots of her activities), which is part of her MT box (mathematics teachers dropbox, shared with her colleagues in her school). In RI box, a Dialogue box (proposed by us) was set for interactions between Anna and us.

The resources in RI box were analysed based on the interactions with Anna, and observations on her school activities, which were sorted into five roles: math teacher, colleague, pre-service teacher mentor, in-service teacher trainer, and researcher. Besides the collectives in her school, Anna participated in several professional collectives (e.g. LéA, IREM), which provide her various resources to balance her roles. The resources were often invoked, forming a complex ecological “living” resource system, as evidenced by Figure 8 (drawn by the author).

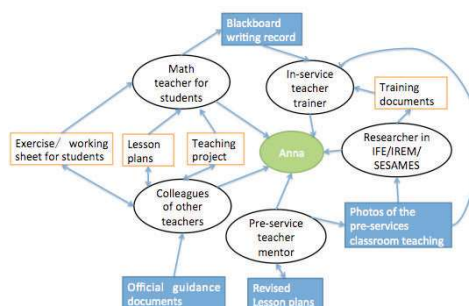


Figure 8. Collective roles of Anna

From September 2015, the collective activities of Anna in specific collectives, such as LéA, IREM, will be followed closely, with specific topics, such as the coming curriculum reform 2016. To make a deep understand of the two teachers' expertise through their resource systems, knowing their current visible resources of them is far from enough, the scheme of forming such a resource system, the source of those key resource, the flow directions of those resources, etc., can provide us a lived map for seeing into their expertise and their professional development. The current work stays on drawing a collective map contains the collectives the teacher participated, the activities and tasks they do, and a personal map contains her entourage who have close cooperation or interactions with her. From November 2015, a pilot follow up in Chinese school will start, which demands several distance follow-up tools.

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