

Lesson Planning: A Practice of Professional Responsibility and Development

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The Importance of Lesson Planning

Much has been made of professional development for teachers, especially in the current era of educational reform, largely because it can facilitate teacher learning (Ball 1996; Little 1993). Teachers in the United States, it is often argued, need to learn more to teach effectively. They need what many refer to as pedagogical content knowledge: not only knowledge of the content, subject matter, or discipline, but also how students learn and make sense of various subject matters as well as pedagogical alternatives that enable student learning in particular subjects (Grossman 1990; Shulman 1987; Wilson, Shulman, and Richart 1987; Shulman 1986).

Some observers have argued that a *collegial professional community* can enable teachers to develop this knowledge within the context of their teaching practice. In such a set of conditions, teachers can reflect upon, explore, and improve their practice (Grossman, Wineburg, and Woolworth 2001; Little 1987; Putnam and Borko 2000; Wang and Paine 2003). Researchers have identified multiple tasks that teachers can undertake in these professional communities: in particular, examining student work, examining others' teaching with videos, and studying multiple subject matters as a group.

One often-overlooked source of professional growth is the development of lesson plans, which are used in China as tools both for personal reflection and development as well as for collegial reflection. Heaton (2000) has advocated thorough preparation to accommodate students with various levels of prior knowledge of the subject matter and different

questions concerning that knowledge. But few have written about the lesson-planning process itself. In the United States, planning and preparation are considered important, but lesson plans themselves seldom consist of more than a list of activities. Developing lesson plans is not often considered a professional-development experience for individuals, nor is it set in the context of a professional-learning community or a given school.

In China, however, organizational structures for both individual teachers and a school's professional community embed lesson preparation in two activities: preparing a lesson plan and refining the plan through "open lessons." In an earlier article (Shen, Zhen, and Poppink 2007), we explained open lessons and how they help teachers to develop their teaching skills. In this article, we explore not only how Chinese teachers develop lesson plans but also how the organizational structure of Chinese teaching enables them to use lesson plans as a professional-development activity.

Lesson planning allows teachers to explore multiple aspects of pedagogical content knowledge. In developing lesson plans, teachers have opportunities to think deeply about the subject matter, including the way the subject matter is represented in particular textbooks or in such aspects of the curriculum as standards and benchmarks. They also have time to develop pedagogical activities or methods that enable students to grasp the subject matter. Finally, lesson planners can ponder what students know and how they may best understand the content.

American and Chinese Teachers' Context of Professional Work

To summarize the differences in the organization of teaching between Chinese and American teachers, Su, Qin, and Huang (2005) defined a set of activities each group undertakes during the day. They found that while the Chinese environment emphasizes improving teaching practice with time to reflect and improve, American teachers are required to lead their classes six or seven hours a day, with little time to reflect or to conduct other activities that could improve their practice. Chinese culture, they point out, emphasizes collectivism, while American culture favors individualism, as Cohen and Spillane (1993) also asserted in discussing American school governance and its role in instruction.

In a case study, Su, Qin, and Huang (2005) found that American teachers' classroom schedules leave very little time in school to undertake activities, including lesson planning, that could improve their teaching practice. American teachers have about thirty minutes for lesson planning, with almost no time for correcting student class work in school or

giving homework feedback to the class as a whole or to individual students; a short, isolated lunch break; and few social or recreational activities with other teachers, in-school professional-development activities, or opportunities to study with colleagues.

Chinese teachers, by contrast, teach only one or two hours a day, in one core subject area. Conversely, they spend considerable time on lesson planning: two hours a week of formal collaboration with colleagues on one core subject, and informally another two hours a day with colleagues on that subject. It also means they have one or two hours a day to correct student homework and class work; thirty minutes for homework feedback and work with individual students; forty minutes of lunchtime with colleagues and forty to sixty minutes of rest time; thirty minutes of recreational time with other teachers; professional-development activities every Friday afternoon; and ninety minutes a week studying with colleagues.

Lesson Planning by Chinese Teachers

Such differences mean that Chinese teachers consider preparing for each lesson a very important responsibility. An elementary teacher has at least two periods a day to prepare, and secondary teachers usually have even more time available. It is widely held that planning is a primary factor in the quality of the lesson.

Textbooks, students, and teaching methods are the three focuses of lesson planning. A teacher is expected to study the textbook thoroughly to understand the lesson content and its place in the larger context of the subject matter. Understanding students' knowledge of textbook contents is also expected. The teacher selects the most appropriate and engaging teaching methods based on knowledge of the textbook and students.

The process of lesson planning. Careful lesson planning takes place at both macro and micro levels. A teacher begins by mapping out the content for the whole semester. The teacher then moves on to planning for the unit, and finally to each lesson in the unit. There is a continuum from semester, to unit, and to each lesson.

An important aspect of lesson planning is emphasizing that the function of each lesson can differ. Lessons can focus on introducing new content, reviewing materials, or applying what has been learned through solving problems. Some traditional steps in planning lessons are emphasized both in pedagogical textbooks and in practice. First, the teacher prepares for writing the plan, a process that includes understanding how a particular lesson relates to the semester content and the unit; learning from professional colleagues' work by studying their lesson plans or seeking input from colleagues; and finding ways to connect the content

with students' everyday lives. Second, the teacher writes the plan. As the actual lesson plan that follows shows, this step includes (a) specifying cognitive and affective objectives; (b) identifying key points of the content; (c) anticipating difficult points for students; and (d) designing the lesson flow—introducing the topic, presenting the new knowledge, strengthening the understanding of new knowledge by application with increasing complexity, summarizing the learning, and assigning homework. After preparing and writing a lesson plan, the planning continues. For example, the teacher finds or makes the most appropriate teaching aids and designs the presentation to display on a projector or blackboard. A teacher is also expected to take notes after the lesson for reflection and improvement. This shows the care with which the teacher must attend to lesson planning.

Administrative context for lesson plans. Lesson plans are a critical criterion in evaluating teachers. The school provides resources for planning lessons, such as preparing a lesson for a group setting, sharing lesson plans with different teachers, organizing visits to other schools, and holding open lessons to promote learning among teachers. In this way, the lesson plan becomes much more than the simple paper exercise it often is in the United States—it becomes a larger part of the organization of teaching as teachers develop lessons and share them both on paper and in practice.

Issues in lesson planning. Generally speaking, teachers in China successfully carry out lesson planning as a professional activity. However, lesson planning in China also presents its own difficulties. First, classes may have forty students in the developed areas of the country but up to eighty in those still developing. Individualizing instruction may be more difficult in large classes. Second, lesson planning occupies so much of the professional day that some teachers feel they could spend that time productively on other responsibilities. Third, planning too extensively might neglect student learning issues that arise spontaneously in class. A fourth issue is that each geographic area in China uses the same set of textbooks, so teachers are usually within a few days of teaching the same lesson. To a certain extent, this rigidity constrains teachers' creativity in designing lesson plans.

An Actual Lesson Plan on the Sum of Measures of Internal Angles of Polygons

The following is an actual lesson plan prepared by Qing Zhang of Weifang Experimental School, Shandong Province, for a lesson using *Mathematics for the Seventh Grade (for the Second Semester)*, a textbook series published by the East China Normal University Press. It illustrates the format and content of a lesson plan that introduces new material. It is common in China to publish compilations of lesson plans

and even verbatim transcriptions of actual lessons as a resource for teachers. This allows other teachers to examine student responses to a particular lesson's content and methodology.

Instructional Objectives

The cognitive objectives are:

- (a) to be able to define a quadrangle, polygon, and regular polygon, and*
- (b) to be able to interpret, prove, and calculate the sum of internal angles of the quadrangle and polygon.*

The ability objectives are:

- (a) to develop the ability for analogical and divergent thinking through studying the definition of the polygon and the sum of internal angles of the polygon, and*
- (b) to develop the ability to diagnose and solve problems by dividing polygons into triangles and utilizing the knowledge about triangles.*

The affective objective is: to develop students' interest in geometry through studying the similarities and differences between triangles and polygons.

Key Points and Difficult Points

Key points:

- (a) the ability to interpret, prove, and calculate the sum of internal angles of the quadrangle and polygon; and*
- (b) the ability to investigate a new phenomenon actively.*

Difficult point: a student's understanding that the vertices of a polygon must be on the same plane, a necessary condition that is difficult for many students to understand.

Ways to emphasize the key points and teach the difficult points include:

- (a) developing and using teaching aids designed by the teacher;*
- (b) facilitating students to think about how to derive geometric theorems;*
- (c) helping students master both individual sets of knowledge, as well as helping them realize the relationship between and among the sets of knowledge;*

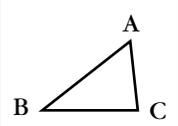
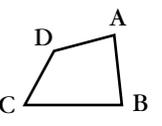
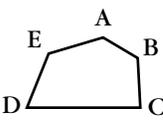
- (d) using a table to systematize students' web of knowledge; and
- (e) designing and implementing exercises with increasing levels of difficulty and complexity.

First Stage of the Lesson: Creating a Situation for Learning

Use multimedia to display a plane view of a weather station. Ask students to find triangles, rectangles, squares, parallelograms, and trapezoids. Ask students to use their knowledge of triangles to define quadrangles and the uses of quadrangles in agriculture, industry, and everyday life.

Second Stage of the Lesson: Student-centered Explorations on Definitions of Quadrangles and Polygons with "n" Sides

- (a) Students first recall the definition of a triangle. Through analogy students try to define a quadrangle. The teacher uses self-made teaching aids to emphasize the necessary condition that all four vertices must be in the same plane. Students then define polygons with "n" sides.
- (b) Students then explore the elements in the definitions of quadrangles and polygons. With teachers' Socratic questioning, students complete the following table.

			
Definition			
How many sides?			
How many internal angles?			
How to notate?			

(c) The teacher emphasizes that when quadrangle is mentioned, we mean (1) rather than (2).

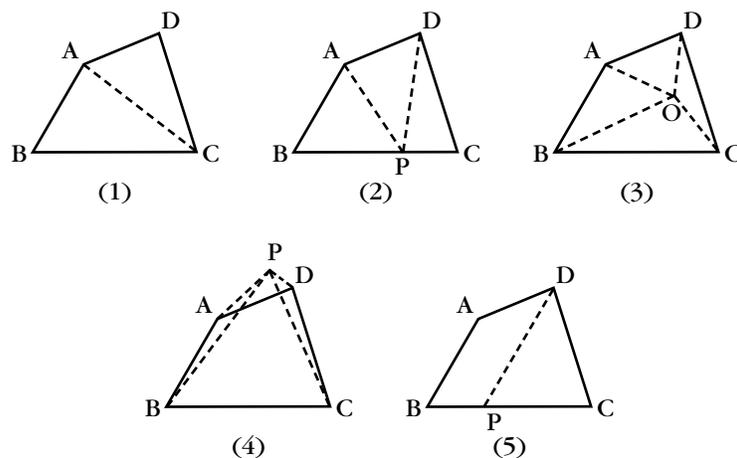


(d) Students answer questions to reinforce their definition of quadrangles and polygons.

Third Stage of the Lesson: Collaborative Approach to Exploring the Calculation of Internal Angles of a Quadrangle

(a) The teacher raises the questions: The sum of measures of the internal angles of a triangle is 180° ; what is the sum of measures of the internal angles of a quadrangle?

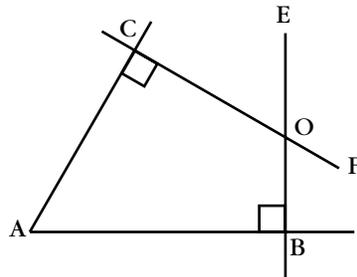
(b) Students try various methods of answering the questions, and the teacher summarizes their approaches using the following diagrams. By comparing methods (1) through (5), as illustrated in the following, students will realize that (1) is the optimal approach.



- (c) The teacher and students summarize the finding on the sum of the internal angles of a quadrangle.
- (d) Students engage in exercises to deepen their understanding of the finding.

Fourth Stage of the Lesson: Exercise with Variations

Students work in groups to solve the following problem. Please refer to the diagram below. $OB \perp AB$. $OC \perp AC$. What is the relationship between $\angle A$ and $\angle BOC$? Please explain your answer. In the diagram, are there any angles that are the same as $\angle A$ in measure?



Fifth Stage of the Lesson: Extrapolating the Findings from Quadrangles to Polygons

- (a) Based on the knowledge that the sum of internal angles of a quadrangle is 360° , students inquire into the sum of internal angles of polygons with 5 sides, 6 sides, and n sides.

Number of Sides of a Polygon	3	4	5	6	7	...	n
Sum of Internal Angles	180°	360°				...	

- (b) Draw the conclusion that the sum of internal angles of polygons with 5 sides, 6 sides, and n sides is $(n-2) \times 180^\circ$.

Last Stage of the Lesson: Summary

- (a) Discussing the methods for solving problems: observe, analyze, guess, analogize, explain, and apply.
- (b) Discussing the methods for studying geometrical concepts: how to define, and how to specify the elements

- in the definition such as sides, angles, and sum of internal angles (briefly mention that the sum of external angles is a topic for future study).*
- (c) *Discussing the thinking processes and methods used in drawing the conclusion that the sum of internal angles of a quadrangle is 360° .*
- (d) *Discussing the notion that triangles, quadrangles, and other polygons are related to each other; and that geometric knowledge comes from and can be used in everyday life.*

Summary and Discussion

Lesson planning, then, is integral to teachers' professional development in China: it includes their individual reflection and study as well as the collegial activities undertaken to prepare the lesson. In a case study written to explain the interaction of the organization of curriculum and teaching in China, Wang and Paine (2003) write of one teacher's personal preparation:

In planning this lesson, Ms. Zhen first spent considerable time reading and analyzing the textbook and teachers' manual to understand "what the important and difficult points were, which area needed to be stressed in teaching, and where students would likely make mistakes." Then she individually developed a preliminary lesson plan by considering "how to teach it in an active way and by involving students in it." (p. 9)

This quotation shows the importance of content knowledge, particularly as it is portrayed in the textbook; understanding what students will make of the content; and linking the two. It also shows the careful study that teachers undertake individually.

Support for this kind of lesson planning is woven into the structure of teachers' work in China in at least two ways. First, as mentioned earlier, much of a Chinese teacher's day is spent preparing for teaching or reflecting on students' work and what could have been done better. Second, the planning can be used as a part of preparation for a "public lesson" (Wang and Paine 2003), or what we refer to as an "open lesson" (Shen, Zhen, and Poppink 2007). Wang and Paine continue analyzing Ms. Zhen's lesson preparation by explaining its social aspects:

Next, she shared her lesson plan with several senior mathematics teachers in the teaching research group and revised it based upon their suggestions. Ms. Zhen then taught a trial lesson in one of the two 6th grade classes she taught which was observed and critiqued by her colleagues in the teaching

research group. She revised the lesson plan again based upon her experience in teaching the trial lesson and suggestions from her colleagues. In the end, she formally taught this public lesson, which was again observed and critiqued by the teachers in the teaching research group. (Wang and Paine 2003)

Restructuring American teaching to resemble Chinese teaching is unlikely anytime soon. Still, Chinese practice demonstrates that lesson planning is an important professional-development activity requiring increased teacher knowledge together with collegial support for improving practice. Teachers' individual and collegial planning and working time may be a necessary condition to improve the quality of teaching in American schools, and detailed lesson plans provide a way for American teachers to better understand content, student learning, and pedagogical content knowledge.

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