



STARTALK Mandarin Elementary Immersion Summer Teacher Education Program (MEISTEP)

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“This two-week practicum was a wonderful opportunity for us to see and learn what it feels like to teach in an immersion environment. Combining practice with theory gave us clear concepts about how to prepare a lesson and how to carry it out.”

-Amy Gao, MEISTEP participant

Introduction

The National Security Language Initiative (NSLI), begun in 2006, is a federally sponsored program coordinated by the Secretaries of State, Education, and Defense and the Director of National Intelligence. Its intent is to expand the number of U.S. Americans capable of achieving advanced- to superior-level proficiency in the country’s high-need languages, among them Arabic, Chinese, Farsi, Hindi and Russian. Several programs have been developed to improve and increase foreign language education including the Flagship Programs, Intensive Overseas Summer Language Institutes, and the most recent program, STARTALK. STARTALK’s specific mission is to support K-16 language teachers and students through summer program experiences that seek to improve the teaching and learning of politically and economically important languages that are less commonly available in U.S. schools and universities.

National interest in the field of language immersion education has also been growing steadily over the past several decades fueled by evidence that immersion provides students with one of the most powerful contexts for becoming proficient in a second language (see Fortune & Tedick, 2008, for research review). Interest in Chinese immersion education, however, is relatively new; in 2005, only twelve such programs were reportedly in operation in the entire U.S. (Center for Applied Linguistics, 2006). This contrasts with the forty-two preK-12 Chinese immersion programs more recently reported by Dr. Bonnie Liao, founder of the Yu Ying Public Charter School in Washington, D.C. (J. Zhao, personal communication, July 11, 2009).

In Minnesota, a state that currently boasts fifty-two dual language/immersion programs in fourteen districts (and five publicly funded charters), there are 610 immersion teachers and 10,834 students. Five of these programs now offer early total Mandarin immersion to some 756 students. Over the next five years student enrollment is expected to grow 171%. The greatest challenge to this growth and to future program development is the acute lack of licensed and highly qualified teachers who

are prepared to teach elementary academic subjects such as math in Mandarin while concurrently attending to children's language development and culture learning.



Fang Wu and Loretta Eng engage in an interactive learning activity during Immersion 101.

To assist in meeting this need, the University of Minnesota's Confucius Institute proposed, and in the spring of 2009 was awarded, a STARTALK grant to develop the Mandarin Elementary Immersion Summer Teacher Education Program (MEISTEP). Several units at the University of Minnesota collaborated to create the immersion teacher development program: the Confucius Institute, the Immersion Projects at the Center of Advanced Research on Language Acquisition (CARLA), and the Second Languages and Cultures and Math Education Programs in the College of Education and Human Development's Department of Curriculum and Instruction. As part of this program, university project developers and course instructors teamed up with Minnesota's first Mandarin immersion school, Yinghua Academy, to provide teacher participants the opportunity to observe mentor

teachers and practice teach in a summer math program for K-4 Mandarin immersion students.

STARTALK MEISTEP harnessed the University of Minnesota's established expertise in language immersion education and teacher development and its emerging leadership in Chinese language education. Project goals were as follows:

- ♦ *To develop and implement a cohesive, four-week summer teacher education experience designed to improve participants ability to develop curriculum and teach math and other subject matter in a Mandarin immersion context;*
- ♦ *To provide a practicum experience through a university-school collaboration between the University of Minnesota and Yinghua Academy;*
- ♦ *To facilitate post-session communication among participants using technology and to exchange lessons developed during the course of the summer program.*

Participants were recruited both nationally and locally and a total number of fifteen provisionally-licensed or prospective Mandarin immersion teachers, all native speakers of the immersion language, participated in the program. As anticipated, their knowledge about and experience with immersion education, U.S. public schooling, family expectations and student behaviors varied, but in many cases was limited. Similarly, participants' prior knowledge and experience with the field of elementary math education in U.S. schools differed. While some were licensed experienced teachers in their home country, others brought professional backgrounds and undergraduate experiences in areas outside of language and education such as engineering.

STARTALK MEISTEP Program

Description

Week one of the four-week program took place during one of CARLA's summer institutes, *Immersion 101: An Introduction to Immersion Education for Chinese and Japanese Programs*. This course provided a research-based introduction to the fundamentals of language immersion education and the integration of language, culture and subject matter for the elementary immersion context.

Week two focused on the theory and methods of teaching elementary mathematics in an immersion setting. Participating teachers deepened their understanding of effective strategies for teaching language and math content simultaneously and addressing culturally specific approaches to mathematics. They also learned about and experienced standards-based lessons and a wide range of instructional approaches. Week two activities were designed to help elementary students develop an understanding of mathematical concepts, to increase their agility in solving mathematical problems, and to articulate their thinking throughout the process.

Weeks three and four of the STARTALK MEISTEP allowed participating teachers to apply their knowledge and engage in the practice teaching of mathematics in the context of the Mandarin immersion summer program at Yinghua Academy. Participants observed experienced teachers, interacted with students during center activities, and collaborated to develop immersion lessons that would integrate language, math content, and culture in a meaningful, developmentally appropriate way. Key to the success of the teaching practicum was the opportunity for participants to reflect on their observations and experiences and to share those reflections with one another each day. The feedback and guidance from a seasoned immersion teacher helped the practicum teachers shape and implement their lessons with the unique needs of their Mandarin immersion students in mind.

The lesson excerpt below began its development during weeks three and four of the MEISTEP experience by program participant, Tian Xia. Tian currently teaches first grade at Yinghua Academy in Minneapolis, MN, and graciously gave permission to Tara Fortune, Yu Wang (Confucius Institute, University of Minnesota) and Amy Egenberger to expand on her work and provide a sample math lesson for other teachers working in Mandarin immersion programs across the U.S.



The "Super Six" teachers who completed all four weeks of the MEISTEP program along with mentor teacher, Amy Egenberger. (From left to right: Amy Gao, Tian Xia, Qin Fang, Amy Egenberger, Fang Wu, Ting Zou and Hsiu-yu Yang)

Mandarin Immersion Lesson Plan: Making the Language-Culture-Content Connection

Context

Program Particulars

Program Model: Early, total, one-way foreign language immersion

Immersion Language: Mandarin Chinese

Grade Level: First grade

Desired Results

Enduring Understandings

When two numbers are added, the sum is the same regardless of the order of the addends. For example, $4 + 2 = 2 + 4$ (commutative property).

Materials

Vocabulary cards, picture cards, chart paper, markers, Ping-Pong balls, video clip of Ping-Pong match in China, student worksheet pencils, unifix cubes

Learning Objectives: The Students Will...

Content

Develop initial understanding of the commutative property. (When two numbers are added, the sum is the same regardless of the order of the addends. For example, $4 + 2 = 6$; $2 + 4 = 6$; $4 + 2 = 2 + 4$.)

Culture

Become familiar with Ping-Pong as one of the Chinese people's favorite sports.

Language

Content-Obligatory

- ♦ Express addition stories with number sentences (a 加 b 等于 c) using the words 加 (plus), 等于 (equals), and 一共 (altogether) with the numbers 1-10.
- ♦ Express the sum of an addition story using the sentence, “一共有...” (There are [number] [noun] altogether.)

- ♦ Accurately replace the number 二 (2) with character 两 to express quantity of a noun, e.g., 两只兔子 (two bunnies), 两只小鸟 (two birds), 两只小狗 (two puppies), 两只小猫 (two kittens), 两只熊猫 (two pandas), etc.
- ♦ Use appropriate measure particle 只 before nouns in the small, cute animal category, e.g., 3 只小鸟 (3 birds), 5 只小狗 (5 puppies), 7 只老鼠 (7 mice), 9 只小老虎 (9 baby tigers), etc.
- ♦ Identify the order of addends in an addition sentence using ordinals such as 第一 (first), 第二 (second), and 第三 (third), or other sequencing adverbs (e.g., 下一个 [next], 然后 [then]), etc.
- ♦ Compare and contrast the relationship between the order of the addends and the sum in an addition sentence using the modal helping verbs 可以/能 (can), 应该 (should) in a compound sentence and one of two options for the conjunction “but” (但/但是), for example, a和b的顺序可以改变, 但是和应该不变. (The order of “a” and “b” can change, but the sum should not change.)

Content-Compatible

- ♦ Provide encouragement, direction and verbal support to a partner or group member with phrases such as 加油! (Come on!), 干得好! (Way to go!), 好球! (Nice hit!), 加油! (Work harder!), 注意! (Pay attention!), 小心! (Be careful!), etc.
- ♦ Identify sporting activities that students are familiar with using the pronoun 我 (I) with the verb 玩 (play) and various sporting activities, e.g., 棒球 (baseball), 足球 (soccer), 曲棍球 (hockey), 橄榄球 (football), etc.
- ♦ Review and use known vocabulary for numbers 1-31, months of the year, seasons and small, cute animals, such as 兔子 (rabbits), 鸟 (birds), 猫 (cats), 狗 (dogs), 老鼠 (mice), etc.
- ♦ Accept an invitation with the language chunk, “当然可以! 我很愿意!” (Sure, I can! I am glad to!)

Learning Strategies

- ♦ *Use graphic organizers:* Create a visual representation of the addition story to assist problem solving.
- ♦ *Find/apply patterns:* Identify the use of measure particle 只 that precedes nouns that identify small, cute animals, and the use of the character 两 instead of 二 (2) when counting things.
- ♦ *Cooperate:* Work in pairs and small groups to solve addition stories.

Teaching and Learning Experiences

Day One: Preview Phase—“Into” Activities

Introduce the game of Ping-Pong as a much enjoyed cultural practice in China. Play a quick warm-up of game of bouncing Ping-Pong

balls in pairs while counting and recording the number of bounces. The teacher previews phrases of encouragement and suggestions for improvement so that children can verbally support their partners. Debrief the game and invite the students' reflection on their personal use of Chinese. Introduce the concept of the commutative property of addition.

Details and Description of Procedures

Introduce Cultural Practice and Exclamatory Phrases of Support

Show a short video clip of Chinese children playing Ping-Pong and cheering; ask the students if they are familiar with this sport and have played it. Briefly talk about how much Chinese people love playing Ping-Pong. Ask the children what sports they like to play at school, at home, with friends. The teacher records this vocabulary on chart paper to reference later.

Ask the students what kinds of things people in America say and do to encourage each other when they are playing a sport. For example, 好! (Way to go!), 好球! (Nice hit!). Tell the children that you are going to show a short video clip and that you want them to listen carefully for the kinds of words or phrases used with Ping-Pong players as they watch a video. After the video ends, ask the students if they heard those watching the game say anything other than a positive encouragement. Call the students attention to the Chinese cultural tendency to make directive comments to players or call attention to mistakes that were made in addition to offering encouragement to players. You may want to share a personal experience if appropriate.

Then show the video clip a second time. Once the video has ended, ask the students to tell a partner any words or phrases of encouragement or correction they recall. Then invite the students to share these words with the whole class as the teacher records their responses on large vocabulary cards. Add a few additional words or phrases to provide sufficient variety if needed. Display these phrases for the duration of this lesson.

Use vocabulary cards to review exclamatory language typical of sport competitions with the children, e.g., 加油! (Come on!), 干得好! (Way to go!), 好球! (Nice hit!), 加油! (Work harder!), 注意! (Pay attention!), 小心! (Be careful!), etc.

Model Math Game Activity

Ask children if they would like to play a bouncing game with Ping-Pong balls. The goal of the game is to see how many times a group of four students can pass the ball back and forth without dropping it or letting it bounce more than once. Model for the children how to play the game with a student volunteer: in pairs, one player gently tosses the Ping-Pong ball to their partner allowing for one bounce only before

the partner catches the ball; the pair tries to keep the ball volleying back and forth as long as possible without dropping the ball or having it bounce more than once.

This activity takes place in groups of four (two pairs in each group) so the teacher invites two more student volunteers to continue the modeling. The teacher explains, then demonstrates, that the pair who is bouncing the ball will count the number of bounces out loud; at the same time, the other pair will encourage these students to do their best using the phrases just introduced. Once the volley has ended, the players write their score in the appropriate circle on the worksheet (see Figure 1). Then the pairs switch roles and play again.

Once both pairs' scores are recorded in the smaller circles, the group works together to find the sum of both scores and the student with the earliest birthday records the sum in the large circle on the worksheet.

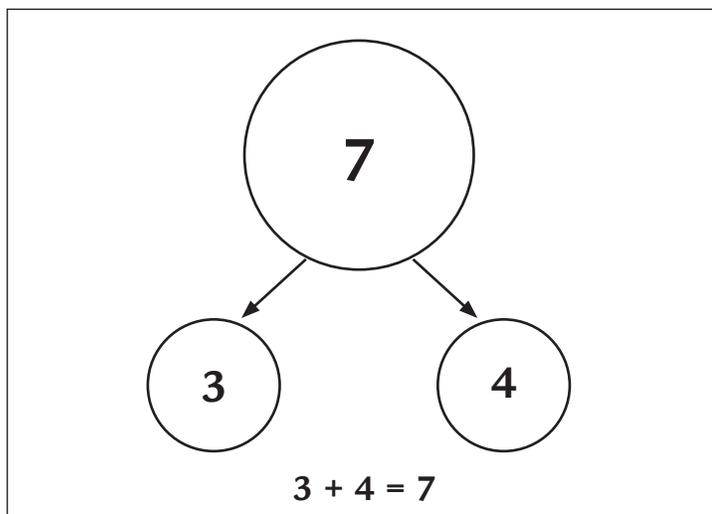


Figure 1: Example of a worksheet for Ping-Pong scores.

Next, this student writes a number sentence with this same information ($x + y = z$) just below the graphic (see Figure 1). Lastly, this student's partner will write the group's number sentence on the chart paper hanging in the front of the room. Be sure to post this series of tasks on the board so that students can refer to it during the activity to make sure they are on task.

Prepare Students for Math Game Activity

The teacher asks the students, "How could you find out which member of a group has the lowest birthday number?" Elicit from the students a sample of questions they could ask to find this out. If necessary, model a question or two and write them on the whiteboard with a picture cue next to the question. Possible questions: 你的生日什么时候? (When is your birthday?), 你的生日在哪一天? (Which day of the month is your birthday?), 你的生日在哪个月? (Which month do you have a birthday?), etc. The teacher asks the students to get

into groups of four and figure out whose birthday comes first. Let the students know that you will be circulating around the room listening for Mandarin only.

Then the teacher tells the group that the student with the earliest birthday (lowest number, closest to January) will choose a partner and they will play the game first. They are also responsible for getting one Ping-Pong ball from the materials basket for their group. The remaining two students will play next and are responsible for getting the math worksheet and a pencil for recording the group member names and scores.

Before beginning the game, the teacher quickly reviews the vocabulary of encouragement and direction, e.g., 加油! (Come on!), 干得好! (Way to go!), 好球! (Nice hit!), 加油! (Work harder!), 注意! (Pay attention!), 小心! (Be careful!), etc. with the vocabulary cards. She then reminds the children to count in Mandarin while bouncing the ball and to verbally encourage their group members using the new phrases. She also reminds the children that she will observe the play and listen for groups who are able to use only Chinese for this activity.

Play the Game

First, the teacher gives the groups a few minutes to practice bouncing the ball. The teacher then gives a signal when it is time to start the game. Each pair of students plays the game, records their scores and together the group finds and records the sum. One student will also write the group's number sentence on the class chart paper. While the students are playing, the teacher circulates and gives the students who are using only Chinese some words of encouragement. After the game is played, the teacher collects the Ping-Pong balls and the math worksheets.

Discuss the Game and Its Findings

The teacher gathers the students around the chart paper for a discussion of the class findings. First, she invites the students to pause a moment and think about the amount of Chinese they spoke during the activity. She asks the children to show her with one hand on their chest a number between 0-5 (fist to five) how much Chinese they used. She then comments on what she observed about the students' language use during the activity.

She then invites one student to use a pointer and lead the whole group as they read the 6-7 number sentences aloud, for example, “3+4一共等于7.” (3 + 4 = 7 bounces altogether.) Once they finish, the teacher computes the class's total number of bounces and offers congratulations with “干得好!” (Way to go!) She then invites the students to read the number sentences together again. This time they are encouraged to hold up the corresponding number of fingers for each number as they say it, and make a big circle in the air with one finger each time they say the word “altogether.”

Call Attention to the Math Concept in Focus: The Commutative Property

The teacher asks the students to look at all the number sentences on the chart paper and talk with a partner about what they notice. The teacher then invites individual students to share with the whole class what they noticed about the number sentences. During this debriefing the teacher ensures that any incorrect number sentences are discovered and changed. (Possible questions for the students: 这些句式相同的是什么? 不同的是什么? 你还注意到什么? [How are these number sentences the same? Different? What else do you notice?]) The teacher also calls attention to any examples on the chart paper of the commutative property, if they exist. If not, the teacher circles one of the number sentences from the chart paper to exemplify this concept. For example, $4 + 6 = 10$.

The teacher writes each of the three numbers (4, 6, 10) on a separate whiteboard and calls on three student volunteers to come to the front and hold one of the three whiteboards. These students are asked to put themselves in order according to the events of a story that the teacher will tell. The student whose number is reported first stands in the left most position; the student whose number is reported last and holds the sum stands on the right. The teacher also invites two other students up to the front to act as number sentence interpreters for the story. As interpreters, they will take turns listening carefully to the story, constructing a number sentence about it and writing it on the large whiteboard for all to see. The teacher reminds the remaining students that their job is to observe and see if they agree with what their classmates are doing.

The teacher tells a short story about two students playing the Ping-Pong game. For example:

开始, Jane拍了4下, 接着, Sarah 拍了6下, 他们一共拍了10下。(First, Jane made 4 hits. Next, Sarah made 6 hits. Altogether, Jane and Sarah made 10 hits.)

The teacher pauses and asks the students who are seated and watching, “你注意到刚才的故事和三个学生的位置有什么关系? 白板上的句式和三个学生的位置有什么关系?” (What do you observe about the relationship between the addition story and the students’ positions? What do you observe about the relationship between the number sentence on the whiteboard and the three students’ positions?)

Then the teacher tells the story a second time. This time Sarah’s score is reported first.

开始, Sarah 拍了6下, 接着, Jane拍了4下, 他们一共拍了10下。(First, Sarah made 6 hits. Next, Jane made 4 hits. Altogether, Sarah and Jane made 10 hits.)

After pausing for student volunteers to complete their tasks, the teacher asks, “在这些句式中, 哪些改变了, 哪些没变?” (What about the number sentences changed and what did not change for these two

stories?), “两个数相加, 这两个数的顺序会改变和吗?” (When two numbers are added together, does the order of these numbers change the sum?) “如果是, 怎么改变的?” (If so, in what ways?)

Possible student observations: “两个都等于10。” (Both equal 10.) “在这个句式里, 第一个数字是4, 在这个句式里, 第一个数字是6。” (In this number sentence [pointing to the numbers on the whiteboard] the first number is 4; in this number sentence the first number is 6.) “第一个数字和第二个数字的位置改变了, 但是最后的数字没有变。” (The positions of the first number and the second number are changed, but the last number does not change.) The teacher guides student responses to the awareness that x 加 y 等于 y 加 x ($x + y = y + x$).

Day Two: Focused Learning Phase—“Through” Activities

In pairs the students will work together to visually display the story problems told by the teacher in two ways. One student uses unifix cubes to show each of the two addends in the story; the other student constructs a number sentence on a small whiteboard. The teacher invites the students to tell a story for the class to interpret.



MEISTEP participating teacher, Amy Gao, prompts students to reflect about their mathematical thinking at a counting station during the ‘math carnival’ on the final day.

Day Three: Expansion Phase—“Beyond” Activities

Each student will draw a picture that tells an addition story to contribute to a whole class storybook about addition stories and helping and playing together. On the back of the picture the student will write two possible number sentences for their story: $a + b = c$ and $b + a = c$. The students will also write two additional number sentences replacing the Roman numerals with Chinese characters. This makes four sentences total (two with Roman numerals and two with characters). The students will need to limit the topics to stories about small, cute animals (a category of nouns preceded by measure particle 只) and the numbers 1-10. They will also be expected to convert 2 to 两 when counting with the nouns. By writing the number sentences on the back of the picture

and not underneath the picture, this book will be able to be used independently by the students to review the commutative property, the use of 两 for 2 when counting and use of measure particle 只 before nouns that fit the category of small, cute animals.

Differentiation

Extra support: Students use the pre-printed worksheets to tell a story, write the number sentences and make a page for the class book.

Challenge: Students increase the number of addends (0-9) in their stories to three and write as many number sentences with that same sum as they can.

Evidence

Lesson-Level Formative Assessment Procedures

Informal assessment occurs through observation of the students' oral communication, use of phrases of encouragement, the students' "fist to five" reflection on personal language use, accurate use of the (两) + measure particle (只) construction instead of the number 2 (二) before certain nouns, and participation in the activities. Math worksheets from the group's game activity and the students' individual contributions to the class book of addition stories will be collected and reviewed.

Conclusion

The purpose of this article was to describe STARTALK MEISTEP, a teacher development program for elementary Mandarin immersion teachers that focused specifically on the teaching and learning of math, and to exemplify with a model lesson how teachers can effectively bridge math, language and culture learning. Teachers who took part in the full four-week program gained new insight and experience in creating lessons and teaching math to k-4 Mandarin immersion students as was evident in comments written on program evaluations and summary statements of learning. We offer a few examples below.

- ♦ “[This workshop] gave me so much good immersion teaching practice both in research and real field experience—it’s very intensive but interesting. Great encouragement by listening, reading and participating.”
- ♦ We learned to “give students more manipulatives to discover the [concepts] and to help students to find the mistake and correct it by themselves.”
- ♦ We learned to “make content and language relate to real life using manipulatives and graphic organizers, ... and to “integrate listening, speaking, reading and writing.”

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