



Learning From Cross-Cultural Educational Experiences

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Presented to the Chinese Delegation, 1-24-2019

我的一点故事

2

1. 在中国的经历

2. 在美国的经历

- 研究生：

- $7 + 5 = (\quad) + 8$ (早期代数)
- “cooperative learning” 小组学习 (教师知识)



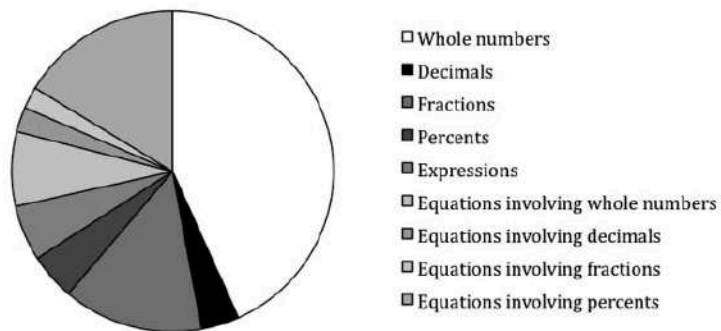
- 大学老师：

- 早期代数+教师知识
- 对美国在职老师与职前老师的介绍
- NSF CAREER grant – 通过中美课堂的比较来提炼早期代数教学的知识以期提高美国小学生的代数思维

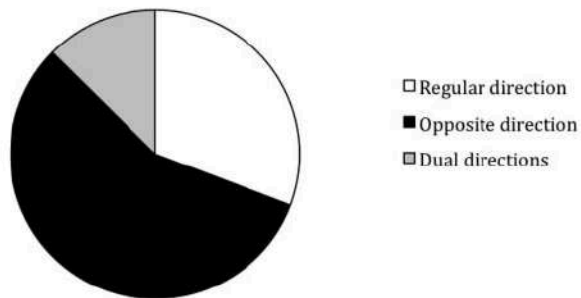


中美教材比较的发现（例1：分配律）

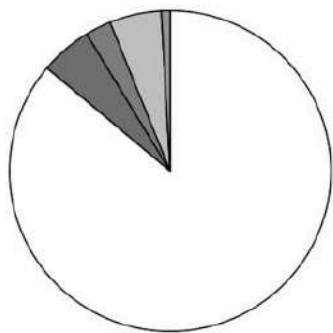
China_JSEP



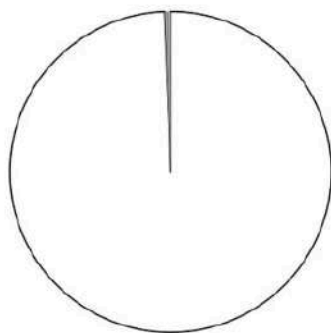
China-JSEP



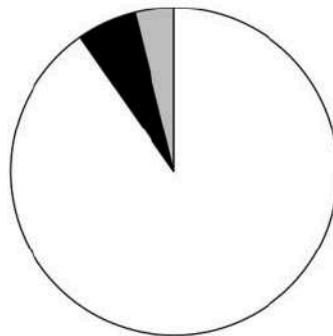
US_HM



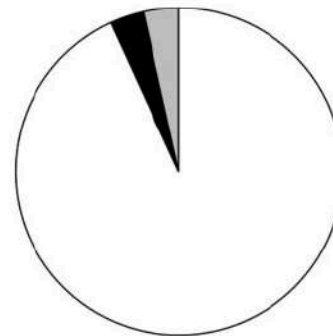
US_SF-AW




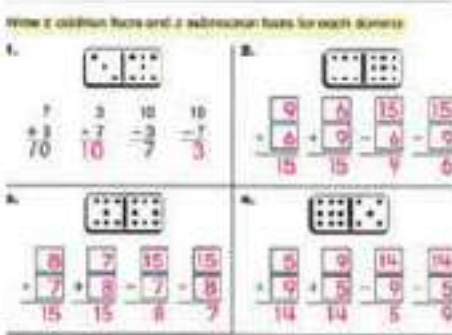
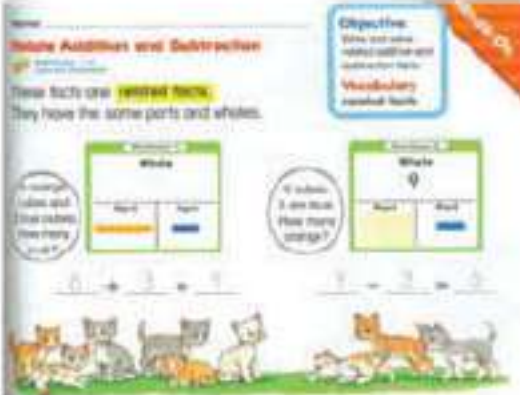
US_HM



US_SF-AW



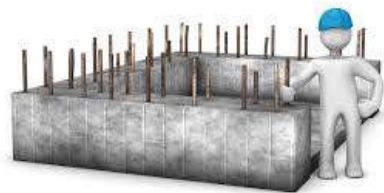
中美教材比较的发现（例2：逆运算）

Chinese	US-EM	US-HM
<p data-bbox="233 323 523 350">Real-world situations</p>  <div data-bbox="224 787 542 858"> $5 + 3 = \square$ $8 - 3 = \square$ $3 + 5 = \square$ $8 - 5 = \square$ </div> <p data-bbox="455 989 649 1022">(G1, v1, p.54)</p>	<p data-bbox="774 323 1112 355">Fact family with dominos</p>  <p data-bbox="1054 1005 1209 1038">(G2, p.124)</p>	<p data-bbox="1402 323 1634 350">Part-whole mode</p>  <p data-bbox="1644 989 1798 1022">(G1, p.154)</p>

What is Algebraic Knowledge for Teaching (AKT) ? 何为代数教学知识？

Early algebra 早期代数

- Inverse relations 逆运算
- Basic property of operations 基本运算定律



Necessary knowledge for teaching it 必要的 代数教学知识

(感想：中美的科研与实践)

What does the literature say? 文献怎么说？

6



1. Worked examples 例题
2. Representations 表征
3. Deep questions 深度问题

IES recommendations 美国教育科学研究所建议

Why Cross-cultural Collaboration ?

为何跨国“合作”？



Current Project 当前项目



Led by Fu Ma 马复教授 (中方负责人)
(With the assistance from
Jing Chen 陈静老师, Guangqun Zhong
仲广群老师, Wei Chen 陈薇老师)

Led by Meixia Ding 丁美霞 @ Temple
University 天普大学

17 teachers from Nanjing, China
(17 位中国南京的老师)

17 teachers from Philadelphia, US
(17 位美国费城的老师)

Project objectives (2014-19) 项目目标

1. Identify 识别 AKT (Yrs 1-3)
2. Refine 完善 AKT (Yrs 3-4)
3. Disseminate 推广 AKT (Yrs 4-5)



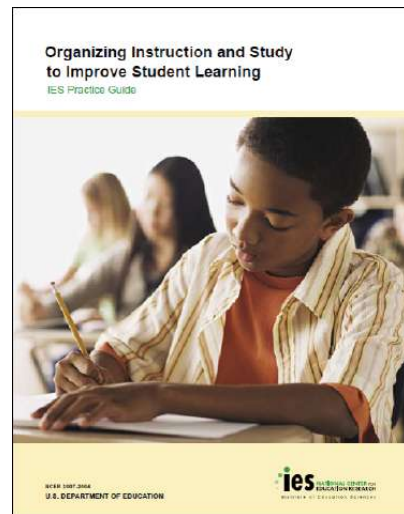
Objective目标 #1 – Identify AKT

10

Analyzed 132 videotaped lessons filmed in years 1-2
分析了132节第一年和第二年的录像课

Results:

- 1) 发表了一些关于例题，表征和提问方面的
科研文章和报道
- 2) 25 个加注的中美录像片段



Objective目标 #2 - Refine AKT

Conduct the intervention session (Y3 video forum + summer workshop) 视频论坛+暑期研讨班

Re-teach the lessons (Y4) 重新教课

Ask:

1. 视频交流是否对老师的跨文化学习有所帮助？
2. 所发现的AKT在课堂教学应用上是否可行？
3. 所发现的AKT在课堂教学应用上面临怎样的挑战？

Research Questions 研究问题

1

Do US and Chinese teachers show interests in their international peers' videos?中美老师对双方的视频感兴趣吗？

2

What different or same aspects do US and Chinese teachers notice about the videos?中美老师对视频的关注点有什么相同和不同？

3

What do US and Chinese teachers learn from their international counterparts' videos?中美老师从他们的国际同伴处学到什么？

Data Sources and Procedures数据源与程序

- ❑ 25 video clips annotated (25个加注的视频)
 - ❑ 12 Chinese & 13 US
 - ❑ Matched topics
- ❑ Online video forums (one month) 视频论坛
- ❑ Summer workshops (20 hours) 暑期研讨班

Online Video Forums 网上视频论坛



<https://www.youtube.com/watch?v=uFfn8diHtvQ&list=PL1r2Nc7utzkbPSvxXEbTaMXSbBr8OZliW&index=1>



http://v.youku.com/v_show/id_XMjc1OTU1NDcyMA==.html?f=49785832&spm=a2h1n.8251843.0.0





YouTube

Search



可以怎么帮助你解决这个（减法）问题？



可以怎么帮助你解决这个（减法）问题？

Online Video Forums 网上视频论坛

Teachers first watched the videos of their interest and then commented on the following:

1. *What do you notice? What stood out to you? 你发现了什么？什么对你而言比较突出？*
2. *What questions do you have in terms of this video or in general? 你对这个视频或者总体而言有什么问题？*
3. *Other comments? 其他评论？*

Online Video Forums 网上视频论坛

YouTube

Search



12 Comments SORT BY



Add a public comment...



Jenn Seidman 11 months ago

I think it was interesting that Rubin understood the idea of inverse operations but did not represent his fact as in the expected way. It is clear that participating students understand the idea of fact families though.

Like Reply



Danielle Murray 8 months ago

I noticed that the teacher used a model to represent the fact family, used turn and talk, and gave the students the first two addition facts. During the turn and talk, I noticed that the teacher did not interact with any students. I am wondering "Does the color really matter when the student was showing the subtraction fact of $8-7=1$."

Read more

Like Reply



Gillian Maimon 10 months ago

Love the depth of this conversation. The amount of time spent on this important open-ended question is key. The children did a great job verbalizing their thinking. I wonder what would have happened had they had the option of telling OR drawing their thinking on the dry-erase board. The visual of the cubes was certainly very meaningful. I wonder what other visual representations the children would have come up with.

Like Reply



Tia Larese 10 months ago

I like the blend of teacher and student talk, stating an essential question, as well as the clear objectives explained throughout the lesson.

Like Reply



Keely Gray 10 months ago

Great student talk, and I like the "thumbs up" for students who agree, so they can still feel as though they are getting credit for their thoughts. The cube is a great visual representation and the students were able to relate the visual to the math.

YOUKU

剧集 电影 综艺 动漫 娱乐 资讯

极限挑战4



我库

全部评论 (20)

发表评论 我的评论消息



土豆用户_757546484 2017年06月11日

孙: 这是所看的一个视频, 感受到了和我们这里完全不一样的学习氛围, 孩子们都很自由。教师非常尊重孩子, 对于没有听明白老师要求的孩子也很耐心的进行提醒。课堂上孩子们主要靠头脑思考, 比较抽象, 如果给孩子一些学具摆一摆可能效果会更好。算式家庭的概念很形象, 符合儿童的心理。

Like Reply



微信用户6631112553 2017年06月08日

Wei: 如果我上这节课, 我会再加一个问题: Why are they called fact family? 🍌

Like Reply



ranshaoyishu 2017年06月07日

菲: 第一次看到英国的数学课堂, 孩子的专注度非常高, 在讨论的时候我发现每个孩子都愿意表达自己的想法, 老师借助了方块火车这一教具, 非常形象的让孩子们理解了一图四式的算式意义。整体风格非常赞同前面老师所发言的真正关注每个孩子, 倾听每个孩子的发言, 对没有达到预想答案的回答也给予肯定, 这一点我非常欣赏。如果能让所有孩子都有这样的学具, 都能自己动手操作一次, 我想印象会更加深刻。

Like Reply



腾讯用户8622517018 2017年06月29日

马丽: 一直很好奇英国的数学课堂是什么样子的, 今天终于看到了, 孩子们虽然席地而坐比较随意, 但是能看出孩子们的注意力都在学习场中, 和看课的其他老师一样, 喜欢孩子们起的“算式家庭”这个名字。也注意到一个小细节, 当一个孩子提到了 $5+3$ 等于8的时候, 老师并没有否定孩子的想法, 而是说, “哦, 你想说另一个算式组”。——欣赏这位老师与孩子们的交流风格和交流方式。不过, 后来的学具操作的目的是什么呢? 是进一步帮助学生理解? 还是验证?

Like Reply



王小蝶 2017年06月29日

FACT FAMILY的概念很形象, 借助于方块列车帮助学生理解四道算式也很直观, 对于低年级的孩子来说, 如果能让他们自己动手操作一辆这样的方块列车, 效果会不会更好一些?

Like Reply



优酷用户6625692096 2017年06月29日

In-person Summer Workshops

面对面暑期研讨班

2 US workshops & 1 China workshop

Further elaborated and reflected on the video comments and what they've learned from international peers 进一步阐述反思视频评论以及他们从国际同伴处学到什么？

Discussed how they planed to implement what they learned to classrooms 讨论如何把所学的应用到课堂



In-person Summer Workshops 面对面暑期研讨班



In-person Summer Workshops



Data Analysis 数据分析

- A total of 233 comments entries (US:120; China: 113)

Video ID	Video	US Teacher	US Youtube Comments	Chinese Teacher	Chinese 优酷comments	Translation of Chinese comments
1	US_G2_T3_FactFamily	Rosemarie Beltz	I like the way the children share information.	高静	美国老师上课也很注重引导和学员操作的啊，算式家庭的说法很有意思。	The American teacher also focused on guiding students and using manipulatives in class, the term of "fact family" is pretty interesting
	US_G2_T3_FactFamily	Elaine Blackmon	I thought Matthew's observation that the same 3 numbers were being used was helpful to the other students.	仲	中国老师会更倾向于早点儿演示学具，让学生明白，8可以分成1和7两部分，故用8减去其中一部分，便得到另一部分。让学生从8个方块里，拿走7个方块，剩下一个，对帮助学生理解加减法的关系帮助不大。	Chinese teacher would prefer using manipulatives earlier to let the students realize that 8 can be divided into two parts: 1 and 7. Therefore, 8 subtract one part equals the other part. Having the students taking 7 cubes from 8 cubes and seeing 1 cube left doesn't help them understand the relationship between addition and subtraction that much.
	US_G2_T3_FactFamily	Mary Brehouse	The use of the cubes is a great visual for children to understand the members of the number family do not change.	利洁	第一次看一节完整的美国课堂，孩子们虽然没有固定的座位，但仍会专注听讲，尤其是课堂参与度很高。易于表达，思维活跃。让人欣赏的是，老师把这一组算式形象的称为“算式家庭”，始终围绕这三个数字组成的算式进行探究他们之间的关系。让孩子们思考并用语言表达自己的想法，再用方块形象的演示，帮助理解。教具的使用能否更加普遍，让每个孩子都动手拿一拿，想一想，或许会更好。	It's my first time watching an entire US lesson. Though the students don't have a fixed seat, they are still focused and actively participated in the lesson. The students are willing to express their thoughts and creative thinking. I like that the teacher called these groups of math sentences "fact family", and guiding the students to figure out the relationship among the math sentences composed by these three numbers. She first let the students think and express their thoughts, and use cubes as representations to help them understand. (Here is the suggestion) Make the using of representations more general, i.e. let very student manipulate, think about it and share their thoughts, is that a better way?
	US_G2_T3_FactFamily	Andrea Domskey	I would have liked to hear Titus explanation of the cubes. I liked the turn and talk. Maybe the students next time could have their own set of cubes so everyone feels involved.	宏理	这是看的一个美国教学视频，孩子们的上课形式还是比较宽松的，他们自由地坐在椅子上，身体非常放松，但孩子并没有发生交头接耳互相说话的现象，很自由地听课。当老师讲与身边的孩子交流怎样用7+1=8来帮助计算8-1和8-7时，孩子们很快地三三两两组合热烈交流。对于孩子的发言，老师很耐心地让孩子说完，老师不是急着急切地进行下一个环节。	This is my first American math class video, I am pretty shocked at how the form of their class, the students sit on the carpet freely, relaxing their bodies, but I didn't notice any talking to each other among students, they just listen to the teacher relaxingly. When the teacher told the students to share with each other how to use 7+1 = 8 to help computing 8-1 and 8-7, the students quickly get into groups of 2 or 3 and began to discuss actively. The teacher also patiently wait the students to finish their talking, and didn't seem to rush to the next topic.
	US_G2_T3_FactFamily	Keely Gray	Great student talk, and I like the "thumbs up" for students who agree, so they can still feel as though they are getting credit for their thoughts. The cube is a great visual representation and the students were able to relate the visual to the math facts given.	丹	和我们平时的课堂一样，会发生一些突发情况，视频中老师很有耐心地给孩子的现状引导；不同其它数字相同颜色？即使孩子没能正确作答，也能够及时的肯定；我很喜欢你的想法，但对于学具的使用，是不是可以再大一些，能清楚地判断出黄红两个部分，这样通过上台演示，同学们也能更好地根据演示理解四道算式之间的关系。	Just like our daily class, there will be unexpected situation, and the teacher patiently guide the students according to the situation: Do we change the number? Are they the same color? Even if the student didn't answer it correctly, she still give credit to him to encourage him: I like your idea. However, in terms of the manipulatives, can it be bigger in order to clearly distinguish the red and yellow parts. Therefore when the students are showing it in the front, the others can better understand the relationship between the four math sentences.
	US_G2_T3_FactFamily	Lisa Hantman	Great kid talk!	王蕾	为了体现加减法之间的联系，课堂采用了“算式家庭”的说法，非常有趣，也体现了算式之间非常紧密的联系。课堂上没有动笔的练习，这与国内课堂的差别比较大。我们的课堂中动手练习好像是不可或缺的部分，尤其是计算课。	To show the relationship between addition and subtraction, the teacher used the concept of "fact family", and it is very interesting, it shows there are very close relationship among the math sentences. There is no practice time in class, and that is different from China. In China, it is necessary to have a practice time especially when it comes to computation.

Data Analysis 数据分析

Codebook (initial + enriched) 编码

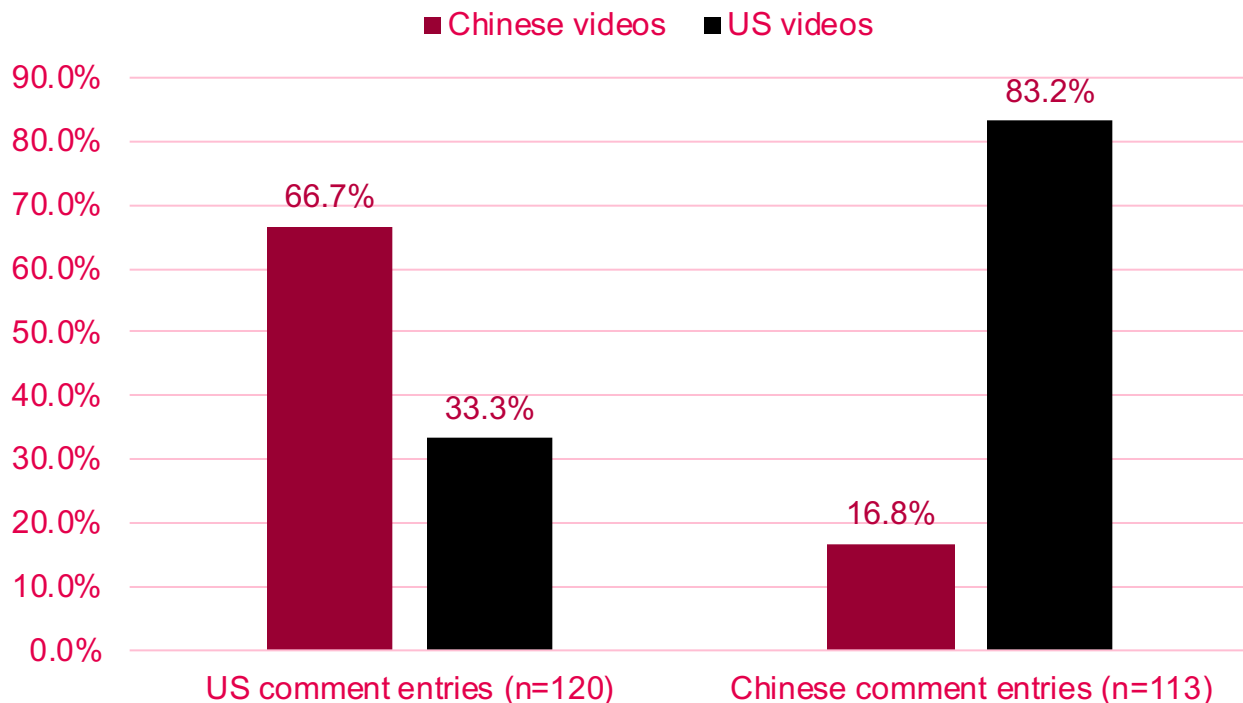
Dimension	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching	Teaching
Category	Communication approach				Representation												
Subcategory	Language	Language	Language	Ask S to Pose Q	Manipulatives	Manipulatives	Manipulatives	Manipulatives	Manipulatives	Purpose	Purpose	Purpose	Diagram	Diagram	Diagram	Diagram	Tallies
Video ID	Suggest more concise teacher language (T talked too much)	Notice cross-cultural differences in teacher language	Like concise language	Like/notice asking students to pose questions	Notice/like manipulatives (cube, sticks) as great visual/show concept formation	suggest letting ALL students manipulate (using cubes)/tell ideas	suggest letting children come up with OWN representations	Suggest using larger manipulatives so the class can see	Question the lack of richness in representation uses	Suggest using manipulatives to understand the relationship/concept (as oppose to the answer)	Wonder about the purpose of using manipulatives (sense-making or check)	Notice S drawing picture to find the answer	Notice/Like the use of diagrams (bar model, number line/counter)	Wonder if tape diagram similar to number line or bar model	Like discussions prior to students completing the bar model	Notice T had S to write up the equation under bar model	Notice drawing tallies
#1																	
					1	1											
					1												
					1	1	1										
					1												

Codes, Categories, Themes

- Resulted in 634 individual codes
- Countered frequencies of codes
- Classified into 4 domains: math/children/teaching/other
- Identified patterns & themes within and across culture
- Checked against the narrative comments & summer workshop videos/notes for trustworthiness

Results (结果) for Research Question 1

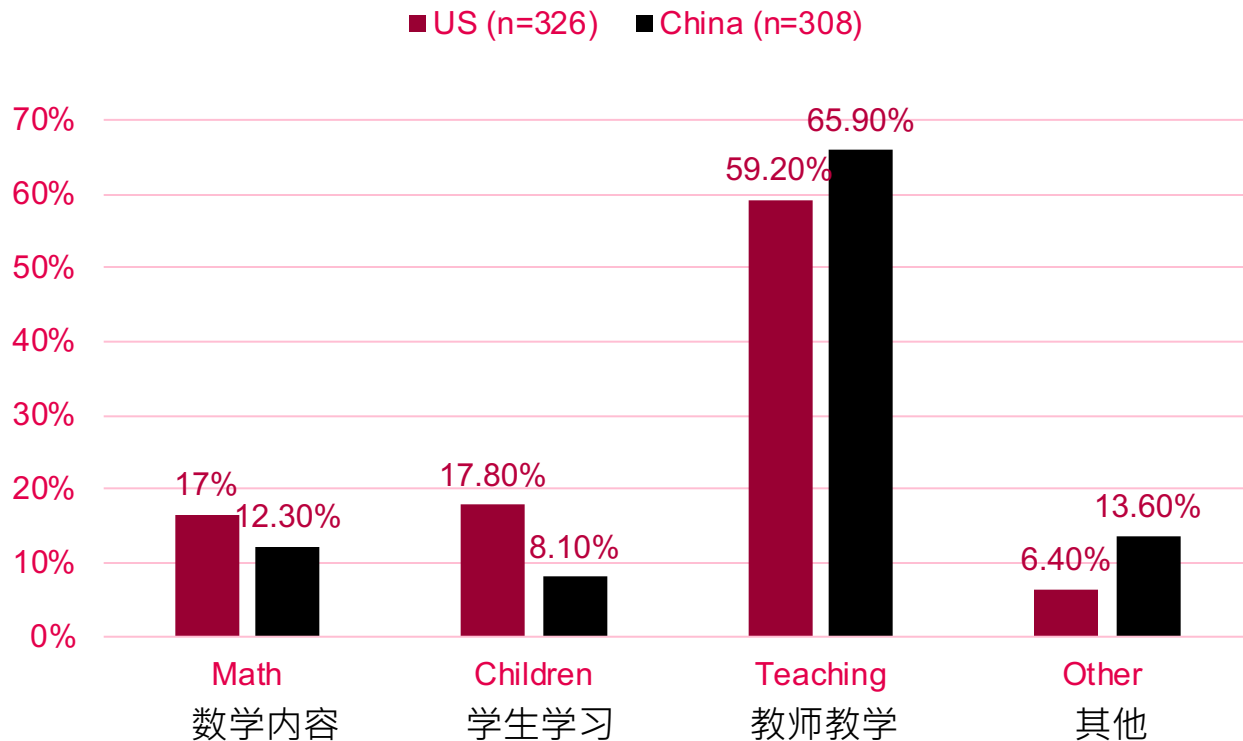
Do US and Chinese teachers show interests in their international peers' videos?中美老师对双方的视频感兴趣吗？



Results (结果) for Research Question 2

What different or same aspects do US and Chinese teachers notice about the videos?

中美老师对视频的
关注点有什么相同
和不同？



Research Question 2 (cont.)

Zoom in on the domain of “Teaching” – most frequently commented on in both countries

Teaching		US Codes	Chinese Codes
Representation	表征	66	73
Communication style	交流风格	63	31
Teacher question/guide	老师提问/引导	22	17
Goal/focus		7	10
Other		25	19
Total		132	150

2a. Representation 表征

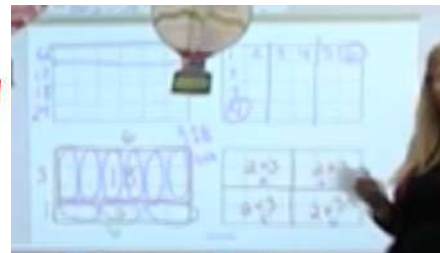
US teachers on Chinese videos

Always start from a real-world situation (生活情境), then fade out to numerical equations (算式)



Chinese teachers on US videos

Concrete representations (具体表征) such as “cubes” (小方块) and the arrays model (方格图)



2b. Communication Style 交流风格

US teachers on Chinese videos

Well-structured Chinese classroom where students acted as “little teachers” and teachers expressed genuine interests in listening to students reasoning 结构谨然的中国课堂里，学生当小老师，老师对学生的推理表现出真正的兴趣

Chinese teachers on US videos

US “relaxed” classroom climate & natural teacher-student relationship 美国宽松的课堂气氛和自然的师生关系



结构谨然的中国课堂

宽松自然的美国课堂



2c. Teacher Questioning/Guide 教师问题 / 引导

US teachers on Chinese videos

- ❑ Impressed by Chinese teachers' serious of rigorous questions (in all videos) 中国老师的严谨的系列问题

*"I noticed how the teacher employs the **questioning technique** to guide student learning. Even if a question answered is incorrect, she never just gives the students the answer. The teacher **guides the students** to figure out the correct answer and take ownership of their learning. She has **set very high expectations of her students**. She has created a safe environment conducive to accountability and responsible learning."*

Chinese teachers on US videos

Questioned US teachers' missing opportunities to pursue students' ideas/ the lack of follow-up questions (e.g., why is it called "fact family"?). 质问美国课堂缺乏深度的跟进问题

Research Question 3

What do US and Chinese teachers **learn** from their international counterparts' videos?中美老师从他们的国际伙伴处学到什么？

Overall总体上

- ❑ *US Teachers* - particularly impressed by **the depth of mathematics** 数学的深度 that children engaged in Chinese classrooms and teachers' instructional approaches 教学方法 to pursue such depth
- ❑ *Chinese Teachers* - more interested in **US relaxed and natural classroom climate** 宽松自然的课堂气氛 and teachers' use of concrete representations 具体表征 to enable students to naturally explore ideas

Learning from China: The Depth of Mathematics

- What can US teachers learn from the depth of Chinese mathematics? 美国老师从有深度的中国数学课堂学到什么？

- Summer workshop topics:

Deep Questioning
深度提问

Concreteness
Fading 具体的淡出

Learning from the US: Natural climate

How can Chinese teachers achieve a natural teacher-student relationship? 中国老师从美国自然的师生关系中学习到什么？

A Chinese Teacher Comment on US Videos

“Why the teacher and the students can be that liberal, equal and democratic (自由平等民主) in class? The teacher can stand, walk, and sit, both teacher and the students are relaxing and free, can we imitate this?”



Summer workshop: Sitting on the floor is not feasible for China; but such a different climate calls for reflection. Why are Chinese math lessons highly structured? Is it for pursuing depth? Yet, is such a depth necessary? 追求这样的深度是否有必要？ Does it support the development of well-rounded students? 对学生的全面发展是否有益？

Learning from Each Other 互相学习

US- Array model

方格图

Combing numbers and shapes
(数形结合)

Infuse the idea of the distributive
property (渗透分配律的思想)

But what is the “purpose” (目的)
of using this model? Lack of
conclusive statements (结论不明)

Favored concrete thinking?

Lacked multiplication Koujue?

Chinese -
Multiplication
Koujue! 乘法口诀
*US teachers are
interested in &
Curious about it*

Discussion 讨论

- Videos as a tool support cross-cultural teacher learning
视频工具有助于教师的跨国学习 (Limitation: Y4 videos to be analyzed)
- Videos as a tool enrich educational research findings
- 视频工具有益于教育科研的丰富 (e.g., Combined insights on *concreteness fading*)
- Videos as a tool may be used for professional development (PD) for more teachers
视频工具可用于更多教师的专业发展 (Objective #3-disseminate AKT)

Discussion讨论

For researchers & practitioners (给科研和实工作践者) :

- Same instructional aspect may embody different meaning cross-culturally. What matters the most?
 - (e.g., supportive learning environment)
- Same instructional aspects may be incorporated differently based on the actual cultural needs
 - (e.g., concrete representations)
 - Chinese teachers may incorporate more “concrete representations” to ensure “all” students learn; US teachers may go beyond concrete to fade it out to abstract representations.

Discussion

For policy makers (给政策决策者) :

- Supportive system for teacher learning
 - US teachers are eager to learn more to improve math instructional skills; are concerned by the lack of time for PD没有专业发展的时间
 - Chinese teachers are eager to create more natural, relaxed classroom environment; are concerned with the high pressure of testing考试的重压

后话：中国2018暑假课堂参观

资助和参与单位：

- National Science Foundation (NSF) 美国国家自然基金会
- Project staff and participating schools, teachers, and students in the US and China项目的工作人员和中美参与学校，老师，和学生
- Temple University 天普大学
- Nanjing Normal University 南京师范大学
- Jiangsu Second Normal University 江苏第二教育学院
- Nanjing School District 南京市教研室
- Nanjing Institute of Educational Science南京市教科所
- School District of Philadelphia 费城教育局
- Philadelphia Convention and Visitors Bureau 费城会议及旅游局

后话：国际合作的可能性

中国校方和教研室的报道；老师的科研文章
美国学校和相关组织的邀请报道
美国国家数学老师协会年会（NCTM, 2019）

- **Ding, M** (symposium organizer, 2019, April). *Enhancing elementary mathematics instruction: A U.S.-China collaboration*.
- 1. Milewski Moskal, M., & Varano, A. (2019). *The teaching of worked examples: Chinese approaches in U.S. classrooms*.
- 2. Larese, T., Milewski Moskal, M., Ottinger, M., & Varano, A., (2019). *Introducing Investigations math games in China: Successes and surprises*.
- 3. Murray, D., Seidman, J., Blackmon, E., Maimon, G., & Domskey, A. (2019). *Mathematic instruction across two cultures: A teacher perspective*.

后话：国际合作的挑战性

持续际合作的困难（如：可操作的行的平台与语言沟通的困难）

中国的教学实践怎样走向国际？（如：中国老师分析评价美国教材？给美国教材备课？甚至直接给美国孩子上课？）

谢谢收听，欢迎指教！

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