Video as a Tool to Support Teacher Learning: A Cross Cultural Analysis

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NCTM, April 2018
Purpose of Study
Literature Review

- Insights of International Mathematics Videos
  - TIMMS - over 1,000 eighth grade mathematics and science lessons → researchers recommended using videos as professional development
Teacher Learning from Cross-cultural Videos

Teachers Noticing about Videotaped Lessons

- Teachers struggle to notice, analyze and reflect upon deeper concepts such as student thinking and engagement in previous studies using videos of teaching (Christ et. al., 2014, Jacobs & Morita, 2002, Borko et. at., 2008 & Santagata, 2011)

- Professional development can increase a teachers’ ability to critically analyze videos (A. vans Es, 2005, Borko et. al., 2008)
Our Study

Extended from prior studies, this study, as a part of a five-year NSF project, explores how videos may serve as a tool to support teachers’ learning in a cross-cultural setting.
## The NSF Project (2014-2019, #1350068)

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## Research Questions

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<td>Do US and Chinese teachers show interests in their international peers’ videos?</td>
<td>What different or same aspects do US and Chinese teachers notice about the videos?</td>
<td>What do US and Chinese teachers learn from their international counterparts’ videos?</td>
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Participants

- 17 US & 17 Chinese Expert Teachers (grades 1-4)
  - All Chinese teachers received teaching awards
  - All US teachers were recommended by school district/principals and 5 are NBCTs
  - 1 male teacher in each country
  - Each teacher taught 4 filmed lessons (n=136)
  - Viewed and commented on 25 video clips through video forums and summer workshops (next slide).
25 video clips with pedagogical merits were carefully selected and annotated in language of peer country
  (12 Chinese & 13 US; ranged from 7 to 17 minutes)

Online video forums (one month)

Summer workshops (20 hours)
Online Video Forums

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
可以怎么帮助你解决这个（减法）问题？
Teachers first watched the videos of their interest and then commented on the following:

1. *What do you notice? What stood out to you?*
2. *What questions do you have in terms of this video or in general?*
3. *Other comments?*
Online Video Forums

College of Education
In-person Summer Workshops

2 US workshops & 1 China workshop; all sessions were video recorded; additional written surveys were conducted

- Further elaborated and reflected on the video comments and what they’ve learned from international peers
- Discussed how they planed to implement what they learned to classrooms
In-person Summer Workshops

It is unclear whether the other problems will share the same pattern.
In-person Summer Workshops
A total of 233 comments entries (US:120; China: 113) were collected from the video forum, which were compiled into a spreadsheet for analysis; all comments were first read with memoing to obtain a general sense of themes.
Codebook Development

Selected one video
Three authors coded teacher comments independently and compared their codes
- Differences were discussed
Reliability was checked (>90%)
Coding Process

Proceeded with the initial codebook
Added new codes based on the “constant comparison approach” (Creswell & Poth, 2018)
The comments entries were first coded to **634 individual codes**, which were combined into different categories, subcategories and eventually **four domains:** math, student/learning, teacher/teaching, and other.

- Frequencies of codes were counted to identify initial patterns/themes.
- Initial patterns/themes were further checked against the original narrative comments & summer workshop videos/notes for trustworthiness.
Results for Research Question 1

Do US and Chinese teachers show interests in their international peers’ videos?

- Yes – the majority of comments were on videos from the opposite country showing international interest
Results for Research Question 2

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

- **Math**: US (17%) vs China (12.3%) 17.80% vs 8.10%
- **Children**: US (17.80%) vs China (13.60%) 65.90% vs 6.40%
- **Teaching**: US (65.90%) vs China (59.20%)
- **Other**: US (13.60%) vs China (12.30%)

**Graph Details**: The bar graph compares the percentages of teachers in the US and China for each category (Math, Children, Teaching, Other). The y-axis represents the percentage, ranging from 0% to 70%.
Research Question 2 (cont.)

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

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<tr>
<th>Teaching</th>
<th>US Codes</th>
<th>Chinese Codes</th>
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<td>Representation</td>
<td>66</td>
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<td>Communication style</td>
<td>63</td>
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</tr>
<tr>
<td>Teacher question/guide</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>Goal/focus</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>150</td>
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Representation

- *US Teachers* - interested in Chinese “concreteness fading” approach - always started with a real-world situation, then faded out to numerical equations.
“Wonderful how the concept began with an illustration of a real-world situation, was verbalized as a story problem by a student, and only then was represented as an equation. Too often, math in the US stays very theoretical. It was clear from the lesson that the numbers were numbers OF something meaningful.”

(Chinese video clip)
Chinese teachers were interested in the concrete representations such as “cubes” in US classrooms (compared with “sticks”). They especially liked the arrays model, which made them reflect on:

(a) “combining numbers and shapes” 数形结合
(b) lack of conclusive statements
(c) lack of Koujue
A Typical Chinese Comment

“During the entire lesson, the teacher used diagrams, charts, and models to teach both the concept of “times” and its computation. This is aligned with elementary students’ thinking characteristics. This aspect is worth our imitating and learning, although our field has already paid attention to this point; yet it is still far from enough. We still used to draw a stationary, stereotypically conclusion.”

(US video clip)
Comments when watching the same US videos:
- *US Teachers* – mostly positive
- *Chinese Teachers* – provide extra suggestions to US teachers & pondered upon the purposes of representations
Communication Style

- *US teachers* - noticed the well-structured Chinese classroom where students acted as “little teachers” and teachers expressed genuine interests in listening to students reasoning
Communication Style

Do you have any suggestions for my explanations?
“This is the first video that I watched, and I felt that the learning environment in US is totally different from the environment here, the kids are very relaxing. The teachers respect kids, and patiently remind the students who didn't understand her requirement.”

(US video clip)
Teacher Questioning / Guide

- US teachers - impressed by Chinese teachers’ rigorous questioning (in all videos)

- Chinese teachers - questioned US teachers’ missing opportunities to pursue students’ ideas/ the lack of follow-up questions (e.g., why is it called “fact family”?)
“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 video clip)
Research Question 3

What do US and Chinese teachers learn from their international counterparts’ videos?
Overall Results

- **US Teachers** - particularly impressed by the depth of mathematics that children engaged in Chinese classrooms and teachers’ instructional approaches to pursue such depth

- **Chinese Teachers** - more interested in US relaxed classroom climate and teachers’ use of concrete representations 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?
- Summer workshop topics:
“Our workshop in August truly lit a fire for me. I am particularly inspired by the idea of concreteness fading. I have endeavored to work this concept into every math lesson that I've taught this year. Embarrassingly, it never occurred to me before August how highly conceptual a notion an equation actually is. I am making sure to build with my students considerable real-world meaning about math concepts before I introduce how these math relationships can be communicated in equation form.”
This year, teachers in both countries refined and retaught the original lessons.

During the interviews, most teachers (especially US teachers) credited their lesson changes to the video resources/intervention received.
Leaning from the US: Natural climate

How can Chinese teachers achieve a natural teacher-student relationship?

A Chinese Teacher Comment on US Videos

“Why the teacher and the students can be that liberal, equal and democratic in class? The teacher can stand, walk, and sit, both teacher and the students are relaxing and free, can we imitate this?”
Learning from the US: Natural climate

(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? Does it support the development of well-rounded students?
Learning from Each Other

Array model

Great for infusing the big idea of distributive property!

Favored concrete thinking?

Lacked multiplication Koujue?

But what is the “purpose” of using this model? Lack of conclusive statements.

Curious about Chinese multiplication Koujue!
“The students are very comfortable justifying and explaining their answers. I was surprised to see how knowledgeable the students were in regard to the multiplication facts. It appears they have a pretty good understanding of multiplication and division and how they are inversely related. Additionally, I would be interested in learning more about the Koujue method for learning multiplication facts. How far along in the school year do they begin learning the Koujue method?”
Discussion

- Teachers in both countries show great interest and learning from international videos
- International collaboration is beneficial for teaching practices (initiates deep reflections; gains insights from peer countries)
- Video clips may be used in further professional development
Discussion

For researchers:

- Same instructional aspect may embody different meaning cross-culturally (e.g., supportive learning environment). What matters the most?

- Same instructional aspects may be incorporated differently based on the actual cultural needs (e.g., Chinese teachers want to incorporate more “concrete representations” to ensure “all” students’ learning; US teachers should go beyond concrete to fade it out to abstract representations).
Discussion

For policy makers:

- 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 (received more PD on literacy but not math)
  - Chinese teachers are eager to create more natural, relaxed classroom environment; are concerned with the high pressure of testing.
References (partial)


