

Chinese lesson study: critical aspects of transfer from China to Italy

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Implementation
of a
CLS-informed
model

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Abstract

Purpose – The aim of this paper is to explore the rationale and findings of the implementation of a Chinese lesson study (CLS)-informed model of mathematics teacher education in Italian schools. The study focuses on the modifications and invariance when introducing CLS in a different culture.

Design/methodology/approach – In a previous work (Bartolini Bussi *et al.*, 2017), the authors focused on a single case of activity inspired by the CLS in Italy, and identified some conflicts emerging between the cultures of teaching in China and Italy and explored the way to overcome the conflicts. In the following years, the authors implemented lesson study (LS) experimentations with dozens of in-service primary school teachers and pre-service teachers who were gradually introduced to the model of CLS. The tensions/constraints occurred prominently when extending the experiments with many dozens of other in-service teachers and pre-service teachers.

Findings – The authors highlighted how the process of deconstruction allowed the participants in the study to either appropriate or reject some features of the CLS, linking this process to the cultural differences.

Practical implications – The authors believe and argue that LS, and CLS in particular, must be modified in the transfer from one culture to another, considering the cultural beliefs of the involved teachers.

Originality/value – The authors claim that the features of CLS compels the Western researchers to adopt local and culturally determined choices and to be aware of the rationale of these choices.

Keywords Chinese lesson study, Cultural transposition, Italian school system, Primary school mathematics, Teachers' cultural beliefs

Paper type Research paper

1. Introduction

This study starts from Bartolini Bussi *et al.* (2017), where the aim was to show an example of cultural transposition (CT) of a teacher profession development approach from Eastern cultural contexts to Italy. CT is a process “where the different cultural backgrounds generate possibilities of meaning and of mathematics education perspectives, which in turn, organize the contexts and school mathematics practices in different ways” (Mellone and Ramploud, 2015, p. 571). We believe that this is one of the strengths for LS spread in different cultures to support the development of good teaching practices. So, we have tried to transpose CLS culturally into our tradition of mathematics teaching. In this study, we refer to CLS that is simply mentioned below as LS.



That article analyzed a LS experiment developed in Italy, highlighting at least two fundamental cultural elements:

- (1) The presence in our context of semiotic mediation theoretical framework (Bartolini Bussi and Mariotti, 2008);
- (2) The temporal dimension that semiotic mediation induces in the transposed LS structure.

In fact, the lesson lasted 17 min more than planned, and this motivated the researchers to explore what factors resulted in this effect. The analysis of lesson videos helped to realize that the teacher implemented communication strategies (e.g. mirroring) typical of our didactic culture and little used in the East, which require a large amount of time. Moreover, the teaching research group used semiotic mediation theoretical framework, where mathematical discussion should not be interrupted during its development (Bartolini Bussi and Mariotti, 2008).

We believe that mathematics education is a knowledge field that is culturally determined (Barton, 2007; Radford, 2003; Bruner, 1996). In this viewpoint, it relies on many cultural and implicit assumptions, such as signs to be used and way to use them, language and ways of representing it (e.g. Brown, 2011; Luria, 1976), habits of behavior, beliefs about the nature and the scopes of education (Bartolini Bussi *et al.*, 2020). If we accept this approach, we must recognize that something so linked to culture – as are didactic practices – cannot be simply transferred in a cultural context different from its original one without losing some of its potential.

2. Literature review on LS

LS is a teacher collaborative professional development model that is originated in East Asia (Li, 2019; Makinae, 2019) and then has been adapted all over the world (Huang *et al.*, 2019; Quaresma *et al.*, 2018). Several studies discuss how LS has been modified to be adapted in different countries (e.g., Wolthuis *et al.*, 2020; Huang *et al.*, 2019; Xu and Pedder, 2015). As noted Winslow *et al.* (2018), many realizations of LS diverged substantially from LS used in Far East countries. This difference may be related not only to factors such as school organization, standards, teacher professional development system, but also to cultural factors such as teacher learning culture (Huang and Shimizu, 2016).

Even in its adapted versions, LS has proven to be a powerful teacher development practice (Huang *et al.*, 2019; Huang and Shimizu, 2016). For instance, according to Akiba *et al.* (2019), LS participants perceived positive changes in teacher knowledge, self-efficacy, and expectation, depending on factors as focus on student thinking, quality of materials, and LS duration. Moreover “the collaborative process, which lesson study brings to teachers, could help teachers incorporate new ideas to improve teaching and learning in their everyday classroom” (Takahashi, 2015, pp. 53–54). Nevertheless, we believe that the issue of teachers’ responsibility development about their own didactic choices, starting from LS training courses, has been not explored enough.

3. CT theoretical framework

Teaching is a cultural activity (Stigler and Hiebert, 1999), thus, teacher professional development must be a culturally relevant activity. So, we propose CT theoretical framework. We use it to study LS transposition as a particular case of CT of a foreign didactic practice.

According to Bruner (1996), culture provides all its members with a set of meanings giving them a certain world perspective, without which any human being would be able to even think. In this viewpoint, for a person encountering a different cultural context means to

encounter different world perspectives, set of meanings and cultural beliefs. The disorientation generated by a different set of meanings allows a re-signification (i.e. a re-interpretation and a new level of understanding) of one's own.

CT is based upon this sort of backdrop action. As Jullien (2006) stated about Greek philosophy and Chinese thought: "It is not a matter of comparison between philosophies or of putting different conceptions in parallel, but we would like to open a dialogue between the different thoughts, which in meeting each other, ask themselves about their own unthought" (p. 8, our translation). Therefore, if we want to study a didactic practice not born in our culture, we have to take into account a sort of "cultural shift". In fact, since it is not possible for us to leave the world perspective proper of our culture, we will never be able to fully understand the whole set of connections between the foreign didactic practice and its original cultural context. Then, we believe that a simple transfer of a didactic practice from a cultural context to another one is likely to be not successful.

CT approach, instead, aims to exploit the encounter with foreign didactic practices to make both researchers and teachers achieve a greater awareness about their own cultural unthoughts. We can paraphrase Jullien in this way: *it is not a matter of comparison among mathematics education practices or of putting different school systems in parallel, but we would like to open a dialogue between the different mathematics education practices, which in meeting each other, ask themselves about their own unthought*. This perspective is particularly important in the Italian cultural context, where the freedom of teaching is enshrined in Italian Constitution, so that each teacher can choose own teaching methods and topic sequencing (Bartolini Bussi *et al.*, 2020). This aspect makes it essential to design professional development courses suitable to support an overall rethinking of teachers' didactic choices.

CT approach involves these key phases:

- (1) Key phase 1 (KP1): Contact with didactic practices of other cultural contexts;
- (2) Key phase 2 (KP2): Deconstruction (Derrida, 2002) of didactic practices and
- (3) Key phase 3 (KP3): Teacher education and development practices.

3.1 Deconstruction

According to Derrida (2002), *deconstruction* refers to "an analysis of the different levels in which a culture is stratified" (our translation).

"Deconstruction resists beyond theory and reconstruction: and, in so doing, it shows how at the heart of every theoretical construction there is inscribed a point of excess that resists beyond theory, that prevents its totalizing closure [...] (Facioni *et al.*, 2012, p. 60; our translation). In this perspective, deconstruction is not *something* "external" that can be caught and described through theory, but something beyond the theory itself.

Still referring to Facioni *et al.* (2012), the moves of deconstruction are as follows:

- (1) Overthrowing of hierarchical oppositions;
- (2) Hyperanalysis which, in the sign, points to the impossibility/unthinkability of the other.

Concerning the first move, Derrida (1981) claims that, from Plato onward, Western cultural and philosophical tradition have set their foundations on the construction of hierarchical oppositions of antinomic concepts (e.g. true/false, essence/appearance and inside/outside), where one of the two values is preferable to its opposite.

Instead, in Confucian and Taoist thought, antinomies are not structured hierarchically, but thought of in an immanent way (Jullien, 2006). Therefore, every time we (as Western researchers) construct a process of conceptualization, we are involved in distinctions that

paradoxically allow the acquisition of the meaning of the concept stemming precisely from the antinomic opposition itself. According to [Derrida \(1981\)](#), “one of these oppositions (the opposition between inside/outside) must already be accredited as the matrix of all possible oppositions” (p. 103). Indeed, if our way of thinking develops by antinomic concepts, this opposition acquires a particular space: every time we conceptualize, we create a space with an *inside*, distinct from an *outside*. Nevertheless, according to Derrida, overthrowing the antinomic opposition does not consist in “switching” the hierarchy between two opposite values, but in moving continuously from one value to its opposite.

The other deconstructive move, *hyperanalysis*, makes it possible to articulate the opposition of antinomic concepts. Hyperanalysis is a sort of continuous movement between two opposites, which is not aimed at reaching a “third term” (i.e., a dialectical synthesis between them), but at undermining their opposition. Hyperanalysis accomplishes this by focusing on the relationship of one opposite with the other without determining a preferable value of one of the two in the hierarchical structure.

3.2 Deconstruction from the outside

A particular kind of deconstruction is deconstruction *from* the outside ([Jullien, 2001](#)), which does not look at the “outside” in a static way but it presupposes a movement *from* the outside. In [Jullien’s \(2001\)](#) reflection, it is based on *indifference*: the opposition, in its Platonic meaning, which is ontologically and hierarchically determined, can only be based on a complete otherness, and therefore indifference, of the two elements at stake (e.g. to be/not to be). So, deconstruction *from* the outside must attempt to continuously perform the operation of subtracting the two elements at stake from this indifference, to put them face to face ([Jullien, 2001](#)).

In this perspective, we gain a new way of thinking about the opposition inside/outside, which can help us interpret the issue of meeting up with cultures different from the Western one. The “deconstruction *from* the outside” consists in meeting different world perspectives, in order to return back to deconstruct Western hierarchies, to identify the Western culture’s points of excess. Encountering other cultures, we meet an “outside”, a form of otherness, which can allow us to look at our hierarchical oppositions from a new perspective, enabling their hyperanalysis.

3.3 Application of CT to mathematics teaching practices

Now we explain the key phases of CT. We believe that Western researchers should undertake the following phases when applying CT to transpose practices from other cultures to Western teaching. In the following, we will simply refer to Western researchers.

- (1) *KP1: Researchers encounter teaching practices from other countries.* This encounter can take place in various ways, e.g., through school textbooks, interviews with privileged witnesses (researchers, school directors, teachers and students), video-recorded lessons, research articles, etc. Then, they begin to reflect, by contrast, on their own unthoughts, on the features that are typical of their culture. This is the beginning of the process of hyperanalysis that enables deconstruction from the outside.
- (2) *KP2: Researchers implement a process of analysis and deconstruction of these practices, to re-interpret some components through the lens of their cultural beliefs and values, and to re-think their educational intentions.* This process can lead researchers to identifying some hierarchical oppositions that the encounter with the foreign didactic practice can overthrow; we refer to this as the *deconstructive potential*.

- (3) KP3: Researchers begin to explore how to import the foreign didactic practice, giving life to an ongoing cyclic process, aimed at designing and implementing several training practices to induce teachers to re-think their teaching practices. Namely, the experimentation of the foreign didactical practice elicits a reflection on its deconstructive potential with respect to some hierarchical oppositions, enabling the process of hyperanalysis. This can lead researchers and experimenting teachers to choose which hierarchies to overthrow and which to maintain, to adapt the foreign didactic practice making it compatible with the new cultural context and with the researchers' educational goals as teacher educators. This process can lead to changes of the foreign didactic practice, to make it appropriate for designing professional development courses. Professional development courses designed in this way can lead to new experimentations, enabling new hyperanalysis processes, and so on.

If we consider Chinese didactic practices, LS could be considered one of those that can be transposed to Western countries through this process (for examples of CT application to other practices see [Mellone *et al.*, 2021](#)). Research questions concern the analysis of deconstruction and of CLS deconstructive potential when introduced in Italian context.

RQ1. How did the deconstruction process work for researchers (teacher educators)?

RQ2. How did it work for in-service teachers and pre-service teachers?

4. Methodology

4.1 Data sources

To illustrate the process allowing us to answer our questions, we analyze what happened in LS experiments conducted by Mathematics Education Research Team (MERT) of the University of Modena and Reggio Emilia during a period of 4 years (2013–2017). Data collected in these years ([Bartolini Bussi *et al.*, 2020](#); [Bartolini Bussi and Funghi, 2019](#); [Funghi, 2019](#)) is the corpus exploited in the preparation of this manuscript.

We choose to collect participants' narration of their LS experience and their reflections, consistently with [Bruner's \(1990\)](#) thought about narration as a means by which the human being organizes own experience and memory. Therefore, analysis of narrative material is particularly suitable to study phenomena intimately connected with the personal processing of experience and memory ([Kaasila, 2007](#)). We chose semi-structured interview with open-ended questions as research instrument, because it "enables respondents to project their own ways of defining the world" ([Cohen *et al.*, 2007](#), p. 182).

More specifically, we focus on data collected from different convenience samples:

- (1) Interviews with MERT researchers who come into contact with CLS realized in Far East from 2013 (2 subjects);
- (2) Interviews with in-service teachers participating in LS experimentations in the years 2013–2017 (40 subjects);
- (3) Interviews with pre-service teachers attending their last year of education, who participated in a LS cycle in a primary school within their internship in the years 2016–17 (5 subjects).

The interviews with the researchers focused on: (1) their experience as observers of CLS realized in China and Japan; (2) potentialities they saw in LS as an educational tool for Italian teachers; (3) possible implementations of LS in Italy. These interviews were conducted by the second author of this paper for her Ph.D. dissertation, and lasted about 2 h each ([Funghi, 2019](#)). These data were used to answer *RQ1*.

Regarding the second and third samples, the participation in the interview was completely voluntary, so they are convenience ones. The interviews were conducted after the completion of LS cycles by different members of MERT, but their main focuses were established and shared in advance. The interviews were used to elicit participants' experiences in the following aspects:

- (1) a short description of the overall LS experience;
- (2) interviewee's feelings during the LS experience;
- (3) aspects that they like or dislike LS, and relevant reasons.

The wording and the order of questions could vary to let the interlocutors focus on the aspects they retain more relevant (Furinghetti and Morselli, 2011) or even to focus on unexpected but interesting issues (Cohen *et al.*, 2007). The interviews lasted between 30 and 90 min, depending on interviewees' time at disposal. These data were used to answer RQ2.

All the interviews were audiotaped, and fully transcribed. In the following, we will report excerpts referring to interviewee's pseudonym and belonging sample (researcher/in-service teacher/pre-service teacher).

4.2 Data analysis

Concerning data analysis, we refer to Lieblich *et al.* (1998), who describe different approaches to narrative analysis, depending on the two dichotomies *form vs content* (regarding the focus on the form or the content of a narrative) and *holistic vs categorical* (concerning the unit of analysis, which can be the whole text or single sentences extracted from the context, respectively). We adopted content-categorical approach, since it is considered suitable to study a phenomenon common to a group of people (Kaasila, 2007). In particular, we looked for:

- (1) Aspects of LS considered suited to or desirable for the Italian context (category "*desirable aspects of LS*");
- (2) Aspects evaluated as not fitting into the Italian context (category "*unfitting aspects of LS*").

The reasons respondents gave to justify their arguments were useful to identify hierarchical oppositions, which have been developed as data-driven categories (Kuckartz, 2019) (see section 5.2 for an overview of detected hierarchical opposition). For example, consider the following excerpt:

At the beginning, it [i.e., LS] seemed a bit "mechanical" because to each activity within the lesson is given a certain amount of time, and I think that in an Italian class giving a certain amount of time is not always easy, it depends on the class, on the situation and on the type of activity that is proposed, so this thing made me doubtful. Actually, I realized that planning in this way the management of the time is better, that is, there is no downtime, and therefore time is used to the maximum [...]
(Sofia, pre-service teacher)

Sentences as "it [i.e., LS] seemed a bit 'mechanical' [...]" and "I think that in an Italian class giving a certain amount of time is not always easy" were categorized in "*unfitting aspects of LS*", since the respondent identifies the strict planning of the time for each lesson phase as a critical point of LS implementation in the Italian context. The reason for this is the high number of variables the respondent feels she has to cope with, pointing to the hierarchical opposition *strict lesson planning/flexible lesson planning*. Instead, the sentence "I realized that planning in this way the management of the time is better" was categorized in "*desirable aspects of LS*": the respondent describes the strict time planning as a benefit of LS, because

she realizes that this way of planning allows to exploit all the time available (pointing to the hierarchical opposition *strict lesson planning/flexible lesson planning*).

The results of such analysis will be presented in paragraph 5.1, for what concerns [RQ1](#) (process of deconstruction activated by researchers), and in paragraph 5.1, for what concerns [RQ2](#) (hierarchical oppositions detected by pre-service and in-service teachers).

5. Results

5.1 Process of deconstruction activated by researchers

5.1.1 Overall deconstructive potential. The contact with CLS activated a process of reflection on unthoughts by MERT in 2013 (KP1). Researchers began to realize what we called LS's *deconstructive potential* in Italian didactical context, as a tool for teacher education practices' innovation (KP2). We can recognize in their reflection the LS's deconstructive potential to overthrow the hierarchical oppositions *abstract/concrete* and *theoretical education/practical education*, with respect to Italian usual teacher professional development (PD) courses.

What surprised me immediately was the complete overturning of PD courses. I had always been used to see PD courses where the teacher educator showed something and teachers then implemented it in their classes. So, this struck me because actually in LS it is the opposite, I mean, actually [...] teacher's training starts from a precise lesson to be done in a precise moment of the academic year. (Roberto, researcher)

After the first LS experimentations (beginning of KP3), the same deconstructive potential has been detected also by one of the in-service teachers interviewed.

The first thing that comes to mind now [...] is the importance of job-embedded training [...] I also believe that we really need this kind of training to face rapid changes (I am referring to increasingly varied and specific learning problems, but also to the relationship among students and between teacher and children ...) (Anna, in-service teacher)

These first experiments were designed following strictly the Chinese lesson duration, which usually is 45 or 40 min for primary and secondary schools ([Li et al., 2016](#)). Regarding lesson plan structure, MERT researchers referred to several LS they witnessed in the years 2013–2015 (see the example of lesson plan reported in [Figure A1](#) in [Appendix](#), and the example reported in [Novotná et al., 2018](#), pp. 251–286). In particular, all the LS implemented were structured with a part where students were involved in activities to solve a given task, and a part of class discussion, coherently with the schedule of the example of [Novotná et al.](#) aforementioned (p. 267): situation setting, problem solving, group sharing and discussion; also the request for the indication of precise timing for each phase, found in lesson plans as the one reported in [Figure A1](#), was maintained.

This first phase allowed MERT to acknowledge some hierarchical oppositions LS could overthrow with respect to Italian school culture. One of such oppositions was *child-centered/teacher-centered approach to teaching*, which affects very much Italian teachers' management of their time at school, together with the opposition *long-term goals/short-term goals*. In Italy, in fact, the rooted belief in a child-centered approach to teaching and an institutional emphasis on long-term goals made LS an interesting educational tool, because it elicited a new and deeper reflection on the relationship between these values and their contraries. We must not forget that Italian school system at primary and lower secondary levels is based on a regulatory framework that establishes only long-term objectives (related to grade 3, 5 and 8) ([MIUR, 2012](#)). Consequently, Italian teachers are not solicited to focus attention on short-term goals, but they usually focus on long-term ones. In China, instead, primary school mathematics teachers usually teach only one subject and spend a lot of their time designing activities related to short-term goals, because they follow structured national ministerial programs ([Xie and Carspecken, 2008](#)). In this perspective, MERT recognized as part of LS's

deconstructive potential (related to *long-term goals/short-term goals* opposition) that of bringing to the fore the issue of how to manage short-term goals in relation to long-term ones.

Hyperanalysis process led MERT to change lesson duration: to maintain LS's deconstructive potential on the two mentioned hierarchical oppositions, they continued to elicit teachers' reflection on the relationship between short-term goals and long-term ones, but lesson duration was increased from 45 min to 60 min. A period of 45 min revealed to be not functional for Italian teachers to achieve their educational goals, even if very circumscribed, because of their need to give attention to every child, accordingly with a child-centered style of teaching.

The class's relational dynamics prevents you from realizing a lesson within 45-minute module. [...] In the case of CLS—which seemed to us the most appropriate to be deconstructed [...] there is an interaction we never manage to achieve. For example, group work that starts and ends within 3 minutes. For us this is impossible, because the relational dynamics between teacher and children are based on another kind of relationship. (Roberto, researcher)

In a similar way, in the next years MERT continued to introduce changes to LS structure to make it compatible with Italian school, without losing its deconstructive potential with respect to several hierarchical oppositions. In particular, accordingly with CT premises, MERT researchers' aim as teacher educators was not to provide a "perfect" work model for Italian teachers, but to provide them an opportunity to rethink themselves as Mathematics teachers and to rethink their own conception of Mathematics teaching in relation to their own educational purposes – overthrowing some of the detected hierarchical oppositions.

5.1.2 Development of the lesson plan. To this aim, MERT kept the internal articulation of Lesson Plan used in first experiments and the structure of LS cycle almost unchanged, since they identified several hierarchical oppositions that could be overthrown maintaining this structure. However, through hyperanalysis process, MERT also identified some additions to the Lesson Plan, suitable to make LS more compatible with Italian didactical context:

- (1) *Analysis of classroom context.* From the first experiments, teachers highlighted the need to describe school context and class composition. Such a need stems from Italian school inclusiveness and Italian teachers' freedom of teaching that allows each teacher to choose own teaching methods, materials and topic sequence (Bartolini Bussi *et al.*, 2020). In this perspective, LS design cannot be separated from the particular context in which it is realized.
- (2) *Analysis of materials.* As Western people, for MERT it was not possible to plan didactic activities with materials without referring to some theoretical framework. MERT choose, then, to use semiotic mediation framework (Bartolini Bussi and Mariotti, 2008). In this perspective, the analysis of artifacts' semiotic potential has become a strong constitutive element in LS experiments.

when it comes to LS it happens that actually we put in LS the strong value of artifacts – namely, the analysis of artifacts' semiotic potential, which is not part of the CLS [...]; however, we bring it inside LS as a contribution of our scientific preparation, of our beliefs. For example, we introduced the management of collective conversations through an adaptation of Mathematical Discussion – naturally within the time allowed by a LS – and we also bring the attention to the study of long-term processes, that are not completely exhausted in a LS session. (Emma, researcher)

MERT researchers also introduced additional parts more directly related to their main goal as teacher educators that is making teachers responsible for their educational choices, and aware of the impact of their lesson design on its development:

- (1) *A column dedicated to educational purposes.* Researchers and teachers needed to dedicate a specific space to meta-reflection on teachers' educational intentions, to

better highlight the meaning of that single lesson in relation with long-term goals. Also this element is related with Italian teachers' freedom of teaching.

One of the problems for teachers is being able to make explicit their educational intentions: when you teach independently, you go into class every morning knowing what you have to do, because you have prepared it, but you have not given yourself any explanation. (Roberto, researcher)

- (2) *A section dedicated to lesson observation.* Participating teachers increasingly felt the need to give indications to team-mates regarding lesson observation. MERT then created a section dedicated to the articulation of observation focus and observation tools. This element is connected with the purpose, as educational researchers, to structure the observation process, in order to make it less based on observers' temporary impressions and more functional to the evaluation of lesson's outcomes.

5.2 Outcomes on hierarchical oppositions detected by in-service and pre-service teachers

Despite these changes, LS maintained its deconstructive potential with respect to several hierarchical oppositions, and allowed a powerful reflection by Italian in-service and pre-service teachers. Since each experiment can potentially highlight new hierarchical opposition to be overthrown, we will limit our discussion to some of the main hierarchical opposition detected until now. We want to show here 2 examples of hierarchical oppositions that have been maintained – i.e. LS did not reveal to be able to overthrow completely – and 4 examples of hierarchical oppositions that LS was successful in overthrowing.

5.2.1 Maintained hierarchical oppositions.

- (1) Child-centered approach to teaching/teacher-centered approach to teaching;
- (2) Teaching as guided by theoretical frameworks/teaching as a-theoretical.

Through the several years MERT experimented LS in Italian schools, these two hierarchical oppositions turned out to be too important for Italian way of conceiving education to be overthrown, even if LS experiences gave both to teachers and to researchers a new perspective on it. In particular, child-centered approach to teaching seemed to be unquestionable for our in-service and pre-service teachers.

[I believe] kindergarten is based on a relational, communicative approach, a little different from this rigid thing [i.e., LS], with precise timings [. . .] I was also a little afraid of getting stuck using this plan, because it is difficult to follow rigid timelines, you can easily lose precious minutes. (Ambra, pre-service teacher)

The detailed definition of contents and timings [. . .] hinders children's interventions and arguments, and alters the didactic contract. It does not allow for insights that are not strictly useful and connected to the lesson aims. (Giulia, in-service teacher)

Moreover, Westerners' way of thinking is inextricable from theoretical frameworks, so for us neither teaching can be conceived without them. So, if we return to the teaching experiment mentioned in the introduction, what has emerged was precisely this impossibility to implement LS without a theoretical framework. For the teaching research group, the designed lesson had no meaning without semiotic mediation framework, so in their perspective the timing planned could be exceeded if this was retained useful to preserve the coherence with the semiotic mediation framework. MERT maintained this possibility, and the semiotic mediation framework to frame activities with artifacts, for all LS experiments in the following years (see Emma's quote in [section 5.1.2](#)).

5.2.2 Overthrown hierarchical oppositions.

- (1) Strict lesson planning/flexible lesson planning;
- (2) Long-term goals/short-term goals;
- (3) Teaching as individual work/teaching as collective work and
- (4) Class as a private space/class as a public space.

As already underlined, for interviewed teachers child-centered approach to teaching was absolutely not negotiable; nevertheless, some of them stated that through LS experience they discovered the (unexpected) effectiveness of a strict lesson planning with respect to this approach. This can be considered evidence of an overthrowing process of the opposition *strict lesson planning/flexible lesson planning* (see also Sofia's quote in paragraph 4.2):

I am more aware of the importance of lesson design in its various phases (*a priori* goal analysis, materials, timings, methodologies, ...) and of discussion with colleagues (both in lesson *a priori* analysis and *a posteriori* analysis). It is easier now for me to predict children's responses and therefore I have a more targeted teaching method for my class, at that moment, for that lesson. (Anna, in-service teacher)

See [Bartolini Bussi and Funghi \(2019\)](#) for more details about these aspects. Connected with the opposition *long-term goals/short-term goals*, we can find in the words of a pre-service teacher a meaningful reflection about Italian teachers' time management.

[The lesson plan] As a design tool, in my opinion, is very useful: because one succeeds in establishing everything s/he wants to do in a lesson, especially where s/he wants to get, which mathematical concept wants to develop during [the lesson]... even if it is an hour lesson (so in any case it is little) but if one succeeds to set significant goals, in the end s/he still succeeds to achieve something. (Renata, pre-service teacher)

LS collaborative structure has been regarded by all experimenting teachers as a powerful tool to re-think teaching as a non-individual practice (insisting on an overthrowing of the opposition *teaching as individual work/teaching as collective work*), even if some of them criticized that LS cannot be carried out for each lesson because of the amount of time and effort it requires.

There are few moments in which teachers of the pedagogical team can work together, observing each other in teaching. [...] Having to plan the lesson in great detail with a structure shared by the working group, in order to be able to discuss it afterwards, greatly influenced the planning of the lesson, even if the Lesson Plan cannot be the paradigm to plan every lesson. (Alessandra, in-service teacher)

Collaboration by team-mates has been underlined also as a powerful resource to exploit during lesson observation, overthrowing the opposition *class as a private space/class as a public space*. In the West, the classroom is generally conceived as a private space, so Italian teachers may find strange the idea of having many observers. LS experience, however, allowed some interviewees to review their positions on observers' presence in classroom, since they appreciated its functionality to receive constructive feedback.

[After LS] you realize... what you can improve[...] you look at yourself and say "Right now I think I was good at handling this situation", then if someone else who watched lesson videos tells you the same, I think that on a professional level it is a very nice thing because you feel capable, you feel skilled, and you become more aware of your difficulties but also your potentialities. (Ambra, pre-service teacher)

6. Discussion and conclusions

This paper aimed to exploit the CT approach for importing in the West didactic practices from other cultural contexts. We referred to CLS as a paradigmatic case. CLS is a case that is not studied in the world as the Japanese lesson study (JLS). The use of CT is the most important original contribution of this paper to the existing literature on LS, and, in particular, to Chinese LS. After the special issue 4 (2017) of the IJLLS that was especially devoted to the CLS, most literature has focused the JLS. Also in a recent volume (Quaresma *et al.*, 2018) no mention exist to the CLS. However we guess that the CT approach might be used also to understand some difficulties and misconceptions met by Western teachers when they realize experiments inspired by the JLS in their Western countries (Clivaz, 2018; da Ponte *et al.*, 2018). Usually the authors list difficulties and misconceptions. We add a further step: the categorization of hierarchical oppositions, distinguishing between the ones that needed to be maintained (5.2.1), as they are too important for Italian way of conceiving education to be overthrown—even if LS experiences gave both to teachers and to researchers a new perspective on it—and the ones that might be overthrown (5.2.2), although the discussion proved to be very helpful to become aware of the features of the Italian way of conceiving education.

In response to RQ1, we found that the shift MERT needed to make from CLS model was due to the transfer process from Chinese culture to Italian culture. When the research team came to know this teacher education practice, it triggered a hyperanalysis process, in which several hierarchical oppositions typical of Western pedagogical-didactic culture were questioned. The progressive changes made to CLS testify a process of continuous negotiation of the meanings in LS transition from one culture to another. In this perspective, we think that CT process of LS reported in section 5.1 showed the need to activate a continuous deconstructive process to transfer practices from other cultures, in order to fully exploit their potential.

Moreover, this paper aimed to address the issue of designing teacher training courses suitable to develop teachers' responsibility of their own didactic choices, as highlighted in paragraph 2. In response to RQ2, the hierarchical oppositions developed from the analysis of collected interviews, showed in section 5.2, highlighted the potential of LS's CT for activating teacher training processes generating a critical attitude towards their own established practices and cultural beliefs.

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Appendix

Lesson Plan

Topic: Grade 5 Volume

Date: 9-6-2015

Time: 45 minutes

Topic: Investigate what happens to the volume when the length of a cube changes

Pre-requisite Skills:

1. Know how to calculate the volume of a cube (length x length x length)
2. Know how to multiply numbers with decimal places
3. Know how to multiply fractions
4. Know how to write simple algebraic expressions

Learning Targets:

1. Discover the cubic proportionality of the volume of a cube when you change its length by a certain multiplier
2. Develop a simple algebraic expression if you change the length of the cube by a certain multiplier

Learning and teaching arrangement:

	Activity	Duration
1.	Minds On Activity: <ul style="list-style-type: none">- Give students 5 minutes to complete a simple worksheet on finding the volume of cube- Take up the assignment and reinforce some of the more important concepts	10 minutes
2.	Modelling/Reasoning (See PPT and Appendix A): <p>In the PPT, we'll investigate the following set of questions:</p> <ul style="list-style-type: none">- What is the volume of a cube whose length is 5cm?- What will the volume of this cube becomes if we double its length? (A)- What will the volume of this cube become if we triple its length?- What will the volume of this cube become if we quadruple its length?- Is there some relationship going on here? Let's have a look!- If a volume of CUBE A is V. What is the volume of CUBE B if CUBE B's length is n times of Cube A? Can you find an algebraic expression to quickly find the volume of cube B?	20 minutes
3.	Consolidation (Appendix B): <ul style="list-style-type: none">- Reinforce the concepts that were explained just now- Give students 5 minutes to talk among themselves and complete the WS ** Multiplication of fractions reviewed.	10 minutes
4.	Conclusion	2 minutes

Figure A1.
A photo of a Chinese lesson plan of a lesson study participated by MERT researchers in 2015 in Macau

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