

ANSWER TO GASCÓN & NICOLÁS

MARIA G. BARTOLINI BUSSI

In this article, I wish to reply to a question posed by Gascón & Nicolás (2017):

To what extent, how, under which conditions can (or must), didactics set value judgments and normative prescriptions in order to provide criteria about how to organize and manage study processes? (p. 26).

Or, to put it in a different form (suggested by Gascón & Nicolás themselves, in their review of an earlier version of this article):

If a theory in Didactics of Mathematics aspires to have a scientific character, can it include *among the research results* normative prescriptions and value judgments?

In the following I distinguish between value judgements and normative prescriptions, which belong to different levels of discussion. But first I wish to discuss the relationships between theory (or theories) and practice (or practices).

Theory and practice: a one-way relationship?

In my opinion, this debate refers (at least partially) to the classical discussion about theory and practice (in education), assuming, however, in the format of the question, a peculiar perspective of order (or dependence) between the two poles:

Theory → Practice

where practice (*e.g.*, organizing and managing study processes) is conceived of as a possible application of scientific theories. I claim that reversing the order

Practice → Theory

might produce an interesting different question:

If a theory in Didactics of Mathematics aspires to have a scientific character, can it consider *among its foundations* normative prescriptions and value judgments shared by school teachers?

Actually I support a dialogical relation between Theory and Practice where normative prescriptions and value judgements may both influence and be influenced by theory.

I start from a classical text. In *The Culture of Education*, Bruner introduced the idea of ‘folk pedagogy’, defined as “taken-for-granted practices that emerge from embedded cultural beliefs about how children learn and how teachers should teach” (Bruner, 1996, p. 46). Hence, ‘folk pedagogy’ is not a scientific theory, but a system of practices, which are connected with *cultural beliefs* that often take the form of *value judgements*. According to Bruner ‘folk pedagogy’ seems to be very influential (even more than normative prescriptions) in the dissemination of practices to both future and practicing teachers. Bruner continues:

Watch any mother, any teacher, even any babysitter with a child and you’ll be struck by how much of what they do is steered by notions of ‘what children’s minds are like and how to help them learn’, even though they may not be able to verbalize their pedagogical principles [...]. In theorizing about the practice of education in the classroom (or any other setting, for that matter), you had better take into account the folk theories that those engaged in teaching and learning already have. For any innovations that you, as a ‘proper’ pedagogical theorist, may wish to introduce will have to compete with, replace, or otherwise modify the folk theories that already guide both teachers and pupils, (Bruner, 1996, p. 47).

Folk pedagogy seems to affect especially less expert people. Whilst an academic scholar working in a constructivist approach (see, *e.g.*, von Glasersfeld, 2002) would link a normative prescription towards an activist and child-centered teaching practice to constructivism, a practitioner would instead link it to a folk pedagogy including beliefs about what is a good way (a value judgement) to teach something to a child.

I work in a city (Reggio Emilia) where a very popular approach to early childhood education was created (the so-called Reggio approach; see Edwards, Gandini & Forman, 1998). Exposure to this approach has created a folk pedagogy for many teachers, not only pre-primary, but also primary school ones, in most cases not even working in the municipal schools that follow the Reggio approach. This folk pedagogy highlights a child-centered approach that acknowledges the existence of, and the need to, respect and even foster “*the hundred languages of children*”. However, many teachers are not able to verbalize their pedagogical principles and, in many cases, they simply think that it is the only good way to teach. Being based on a strong belief, this folk pedagogy cannot be a subject of scientific debates.

Hence

- folk pedagogy seems to be stronger than any research result (if any) of a theory, that might be transformed into a normative prescription;
- some value judgements, rather than being research results, seem to be among the bases of folk pedagogy.

This discussion highlights that adopting a simple one-way order theory → practice is likely to raise contradictions.

In a *dialogical perspective*, on the contrary, a scientific theory has a two-way relationship with practice. This perspective is assumed, for example, by some Italian scholars (*e.g.*, Arzarello, Mariotti and myself), who have worked for decades in mixed groups of academics and teacher-researchers in what is called *research for innovation*

(e.g., Arzarello & Bartolini Bussi, 1998). They elaborated scientific theories (e.g., the Theory of Semiotic Mediation (TSM), by Bartolini Bussi & Mariotti, 2008; the APC approach, by Arzarello, 2008) through this collaborative work of academics and teacher-researchers. For instance, in the case of TSM, the impulse to introduce and characterize the construct of *mathematical discussion* (Bartolini Bussi, 1996) came from the teachers' needs to highlight whole class interaction and the teachers' cultural roles. These needs were stated in many papers (as founding principles) and summarized later as follows:

In the 80s, the author and a group of mathematics teachers (grades 1–8) started to study the conditions for realizing effective whole class interaction. Within the European tradition of teaching and learning, we felt uncomfortable with the one-sided focus on learners' activity and on peer interaction that characterized the constructivist approach (dominant in those years in the field of mathematics education). We did not consider this focus respectful of the cultural role of teachers. (Bartolini Bussi, 2009)

A Vygotskian approach proved to be the most suitable choice to fit these needs. The Italian context was favorable: the works of Vygotsky had been translated into Italian many years earlier (for instance, a complete critical translation of *Thinking and Speech* appeared in Italian much earlier than in English and French) and, thanks to the effort of many Italian educators who had no ideological prejudice against Marxism, Vygotskian ideas became popular among primary school teachers. Hence, the teacher-researchers were active contributors to the development of the theoretical framework, which as a result became consistent with their folk pedagogy. Our theory was, in some sense, biased by practice, too. But the aim was to construct a scientific theory that could be compared with other scientific theories. Were we able to produce normative prescriptions and value judgements starting from this theory? I am a teacher educator and I have exploited this theoretical framework and the experimental part of the study in my teaching of pre-service and in-service teachers. I have also served as an advisor in both local/regional and national committees for 'Standards' (i.e. institutional prescriptive norms). It is not surprising that our values and/or the results of our research programs have biased my contributions to these committees. For instance, TSM was used by the CIIM [Italian Mathematics Education Committee] of the Italian Mathematical Society to present the Mathematical Laboratory method [1] and this had a great influence on the Italian *National Standards* (such as those from 2007) which included values and norms. Yet, the *Standards* were not the outcomes of the TSM as a scientific theory, but the result of a complex system of contributions, including not only scientific results but also the expectations of teachers, principals, parents and so on, and, in most cases, biased by folk pedagogy. Hence, I agree with most of the participants in Gascón & Nicolás's interviews, that results in didactics could be used to support norms, although they are not research outcomes. In TSM, value judgements are not outcomes but foundational aspects (in contrast to other theoretical frameworks). In this way, theory and practice enter a dialogical relationship, similar to the one shared by scholars

from Activity Theory. It is worthwhile to mention this statement by Stetsenko and Arieievitch (2014):

Kurt Lewin's famous expression that there is nothing more practical than a good theory could thus be expanded, in the spirit of Vygotskian approach, by the mirror expression—that there is nothing more theoretically rich than a good practice. (p. 235)

Is the tension towards theories 'universal'?

The discussion about the function of theories in Didactics of Mathematics (or Mathematics Education, as it is called in Anglophone countries) is old, although, as I shall argue, limited to the West. It was a topic already of the ICME5 Topic Group (Steiner, 1985), mentioned also in the volume *Didactics of Mathematics as a Scientific Discipline* (Biehler, Scholz, Strässer & Winkelmann, 2002), and mathematics education as a scientific discipline was considered also in the ICMI Study 8 (Kilpatrick & Sierpiska, 1998).

These selected citations suggest some reflections. If we go through the authors listed in the tables of contents of the two quoted volumes we find, with very limited exceptions, only researchers from the West. It would be easy to rank the represented countries or regions to show the dominant voices in the field. The lack of voices from some parts of the world (e.g., Asia and Africa) is evident.

Many African scholars come from so-called non-affluent countries, and this limits their participation in international conferences. Hence in many cases they are shy, as if they were not able to enter the discussion. To meet this challenge, ICMI continues to support the activity of AFRICME [2], a forum for mathematics educators throughout Africa, and devoted two of the five Capacity and Networking Projects (CANP) to Africa (Mali in 2011 and Tanzania in 2014). CANP is a major international initiative in the mathematical sciences in the developing world, to help exchange information, share state of the art research, and identify strategies for addressing barriers to enhancing mathematics education and for building a sustainable network for policy makers, scholars and practitioners across those targeted regions [3]. Through CANP hopefully also African scholars will develop a sense of identity and will be able to raise their voices in the international context.

In the case of Asia, ICMI launched a specific ICMI Study (Leung, Graf & Lopez-Real, 2006) at the end of the 1990s. In those years, new interest in Far East mathematics education appeared and was fostered by the large number of students (Asia covers more than 70% of the world population) and the high performances of East Asian students in international comparisons (e.g., PISA).

East Asia is a paradigmatic case of a large region which is not covered by the participants interviewed by Gascón & Nicolás. East Asian scholars might have positions very different from the ones expressed and it would be interesting to invite some East Asian voices to contribute to the discussion, by answering questions like:

What are normative prescriptions and value judgments underlying the East Asian success in international assessment?

Could these normative prescriptions and value judgements (if any) be the outcomes of theories in mathematics education? Which theories?

The first question has already been addressed by many East Asian scholars (e.g., Leung *et al.*, 2006). The other is trickier and deserves some discussion. In the past decade I have had some personal collaborations with several Asian colleagues and many occasions to come in touch with the so-called Confucian Heritage Culture (CHC). Here I wish to raise the following question:

Is Didactics of Mathematics conceived of as a scientific discipline in the CHC? More generally, is the tension towards theories shared in the CHC, too?

As far as I know, my answer is negative. I might offer several examples, but I have chosen just one, *i.e.* the case of *Lesson Study* (LS), a model of teacher education and development, initiated in Japan more than one century ago and now very popular in the West, too.

A Lesson Study cycle

consists in preparation, actual class and class review sessions [...] This process begins with finding and selecting materials relevant to the purpose of, and is then followed by refining the class design based on the actual needs of the students and tying all this information together into a lesson plan. The significance of LS is that all of these processes are performed in collaboration with other teachers. A classroom is then taught based on the teaching plan devised. The class is observed by many teachers, who are sometimes joined by university instructors and supervisors from the board of education, and a review session is held for all observers after the class. (Baba, 2007, p. 2)

In spite of the hundreds of papers on Japanese Lesson Study (for a recent review, see Winsløw, Bahn & Rasmussen, 2018), there is not yet a theoretical introduction to it. In the most recent volume on LS (Quaresma *et al.* 2018) the ‘need’ (a Western need?) of theorizing LS is stated explicitly and contrasted with the Japanese situation. In the final chapter Clivaz & Takahashi (2018) argue that the knowledge of Japanese experts is contingent upon cultural and institutional conventions, rather than upon theoretical arguments.

This distance from theorizing is shared by Chinese experts, too. Rather than framing their empirical data in theories, Chinese scholars focus on the context and the values of CHC. For instance, Chen (2017), in a special issue of the *International Journal of Lesson and Learning Studies*, devoted to the Chinese version of Lesson Study, summarizes the cultural background as follows:

The characteristics that are inherited from the Chinese culture, a meaning and value system represented by symbols including language and routine social activities [...] ‘Traditional Chinese cultural resources’ refer to the classic thoughts, which have been passed down to contemporary China over 2,500 years of history. They are embodied in average Chinese people’s actions, and embedded in the socio-cultural contexts of today’s China. (p. 284)

Chen reports the findings of the study as follows:

First, in terms of their actions, the Chinese teachers enact their understanding of teaching in public lessons through unity of knowing and doing more than conceptual explication.

Second, with regard to their thinking, the Chinese teachers use practical reasoning in deliberate practice of repeated teaching through group inquiry and reflection.

Third, a tendency of emulating those better than oneself is evident in novice teachers’ learning from ‘good’ examples by expert teachers (p. 283).

The emphasis is on practical reasoning (the *unity of knowing and doing*) rather than on conceptual explication and the theoretical framework is replaced by a presentation of the cultural framework.

Hence, it seems that the tension towards and the need for theories are not shared in the CHC, which instead highlights the importance of learning by practicing within a given cultural context. Surely normative prescriptions and value judgements exist in CHC, but they cannot be the outcomes of (not-existing) scientific theories. This suggests another question:

If theories are missing in CHC, what might be the sense of the questions raised by Gascón and Nicolás?

Concluding remarks

In Bartolini Bussi & Martignone (2013) we already posed the problem of the difference between cultural traditions. We hoped to raise a debate among the FLM readership and we encourage again this debate around the issues raised by Gascón & Nicolás (2017). Our position may be summarized by a reference to the French philosopher and sinologist F. Jullien, who claimed the importance of intercultural dialogue as follows:

Il ne s’agit pas là de philosophie comparée, par mise en parallèle des conceptions; mais d’un dialogue philosophique, où chaque pensée, à la rencontre de l’autre, s’interroge sur son impensé [4] (Jullien 2006, p. vi).

From this perspective, I believe that the discussion started by Gascón & Nicolás is very important and challenging. I hope it might compel Westerner scholars to question *their own impensé*, if they are willing to approach representatives of other cultural traditions.

Acknowledgement

I wish to thank all the colleagues I meet in Conferences, Seminars and Projects all over the world, especially those who took part in ICMI Study 23 (Bartolini Bussi & Sun, 2018), which offered a terrific context to discuss cultural differences. In this long process I had the opportunity to learn a lot and to continuously bring into question my beliefs. Moreover, my colleagues and friends Chiara Bertolini, Benedetto di Paola, Silvia Funghi, Maria Mellone, Francesca Martignone and Alessandro Ramploud took part in many discussions about the issue of cultural differences and compelled me to question my own unthought.

Notes

[1] See, e.g., <http://www.matematica.it/tomasi/lab-did/pdf/matem-2003-curricolo.pdf>

[2] See <https://nickpgill.github.io/emscdc/AFRICME1.pdf>
 [3] See <https://www.mathunion.org/cdc/scholarships/capacity-networking-project-canp>
 [4] This is not about comparative philosophy, about paralleling different conceptions, but about a philosophical dialogue in which every thought, when coming towards the other, questions itself about its own unthought (my translation).

References

- Arzarello, F. & Bartolini Bussi, M.G. (1998) Italian trends in research in mathematics education: a national case study in the international perspective. In Kilpatrick, J. & Sierpinska, A. (Eds.) *Mathematics Education as a Research domain: A Search for Identity*, Vol. 2, pp. 243–262. Dordrecht: Kluwer.
- Arzarello, F. (2008) Mathematical landscapes and their inhabitants: perceptions, languages, theories. In Emborg, E. & Niss, M. (Eds.) *Proceedings of the 10th International Congress of Mathematical Education*, pp. 158–181. Copenhagen: ICMI.
- Baba, T. (2007) How is lesson study implemented? In Isoda, M., Stephens, M., Ohara, Y. & Miyakawa T. (Eds.) *Japanese Lesson Study in Mathematics: Its Impact, Diversity and Potential for Educational Improvement*, pp. 2–7. Singapore: World Scientific Publishing Company.
- Bartolini Bussi, M.G. (1996) Mathematical discussion and perspective drawing in primary school. *Educational Studies in Mathematics* 31(1–2), 11–41.
- Bartolini Bussi, M.G. (2009) In search for theories: polyphony, polysemy and semiotic mediation in the mathematics classroom. In: *Proceedings of the 33rd Conference of the International Group for the Psychology of Mathematics Education: In search for theories in mathematics education*, Vol. 2, pp. 121–128. Thessaloniki: Aristotle University of Thessaloniki.
- Bartolini Bussi, M.G. & Mariotti, M.A. (2008) Semiotic mediation in the mathematics classroom: artefacts and signs after a Vygotskian perspective. In English L., Bartolini Bussi, M.G., Jones, K., Lesh, R., Sriraman, B. & Tirosh, D. (Eds.) *Handbook of International Research in Mathematics Education (2nd edition)*, pp. 746–783. New York: Routledge Taylor & Francis Group
- Bartolini Bussi, M.G. & Sun, X.H. (2018) (Eds.) *Building the Foundation: Whole Numbers in the Primary Grades. The 23rd ICMI Study*. Cham, Switzerland: Springer.
- Bartolini Bussi, M.G., Martignone, F. (2013) Cultural issues in the communication of research on mathematics education. *For the Learning of Mathematics* 33(1), 2–8.
- Biehler, R., Scholz, R. W., Strässer, R. & Winkelmann, B. (2002) *Didactics of Mathematics as a Scientific Discipline*. Dordrecht: Kluwer.
- Bruner, J. (1996) *The Culture of Education*. Cambridge, MA: Harvard University Press.
- Chen, X. (2017) Theorizing Chinese lesson study from a cultural perspective. *International Journal for Lesson and Learning Studies* 6(4), 283–292.
- Clivaz, S. & Takahashi, A. (2018) Mathematics lesson study around the world: conclusions and looking ahead. In Quaresma, M., Winsløw, C., Clivaz S., Da Ponte, J.P., Ní Shúilleabháin, A. & Takahashi, A. (Eds.) *Mathematics Lesson Study Around the World*, pp. 153–164. Cham, Switzerland: Springer.
- Edwards, C., Gandini, L. & Forman, G. (1998) *The Hundred Languages of Children: The Reggio Emilia Approach-Advanced Reflections. Second edition*. New York: Ablex Publishing Corporation.
- Gascón, J. & Nicolás, P. (2017) Can didactics say how to teach? The beginning of a dialogue between the anthropological theory of the didactic and other approaches. *For the Learning of Mathematics* 37(3), 9–13.
- Jullien, F. (2006) *Si Parler Va Sans Dire: Du Logos et d'Autres Ressources*. Paris: éditions du Seuil.
- Kilpatrick, J. & Sierpinska, A. (1998) (Eds.) *Mathematics Education as a Research Domain : A Search for Identity*. Dordrecht: Kluwer.
- Leung, F.K.S., Graf, K.D. & Lopez-Real, F.J. (2006) (Eds.) *Mathematics Education in Different Cultural Traditions. A Comparative Study of East Asia and the West. The 13th ICMI Study*. New York: Springer.
- Quaresma, M., Winsløw, C., Clivaz, S., Da Ponte, J.P., Ní Shúilleabháin, A. & Takahashi, A. (2018) (Eds.) *Mathematics Lesson Study Around the World*. Cham, Switzerland: Springer.
- Steiner, H.G. (1985) Theory of mathematics education (TME): an introduction. *For the Learning of Mathematics* 5(2), 11–17.
- Stetsenko, A. & Arieivitch, I. (2014) Vygotskian collaborative project of social transformation: history, politics, and practice in knowledge construction. In Blunden, A. (Ed.) (2014) *Collaborative Projects: An Interdisciplinary Study*, pp. 217–238. Leiden: Brill.
- von Glasersfeld, E. (Ed.) (2002) *Radical Constructivism in Mathematics Education*. Dordrecht: Kluwer Academic Publishers.
- Winsløw, C., Bahn, J. & Rasmussen, K. (2018) Theorizing lesson study: two related frameworks and two Danish case studies. In Quaresma, M., Winsløw, C., Clivaz, S., Da Ponte, J.P., Ní Shúilleabháin, A. & Takahashi, A. (Eds.) *Mathematics Lesson Study Around the World*, pp. 123–142. Cham, Switzerland: Springer.

Editor's Note

The two articles preceding this note, and the two short communications following it, respond to an article in issue 37(3). In that article Josep Gascón and Pedro Nicolás summarise and analyse comments from several mathematics educators addressing the question of how and if ‘didactics’ can make normative prescriptions. They close with a set of questions related to teaching and different approaches to educational theory. They also invite “all members of the community of didactics of mathematics to give their own answers to these or related questions, in the form of communications sent to *For the Learning of Mathematics*.”

There have been a number of submissions that take up this invitation, either by answering the questions posed, or (as is the case with the articles in this issue)

related questions having to do with the assumptions behind the questions posed. These responses are important in making explicit what Gascón and Nicolás called “non-questioned components” of our approaches, as a contribution to a continuing dialogue. Additional articles and communications will appear in subsequent issues.

It is pleasing to me that we are receiving such responses. In issue 2(1) David Wheeler wrote “I am pleased to have some ‘Communications’ to print in this issue and I believe readers will find that this section can contain as much substance as any other part. It is a start, at least, on laying down a feedback loop that will, I hope, be increasingly used.” Readers are encouraged to react to what they read, as a contribution to the ongoing conversation that is FLM.
