

Date: June 11, 2020  
From: Janine Remillard  
Re: Response to Multilingual Project Material

I found it very interesting to look over the material resources you have compiled for this project, including several of the completed translating issues reports on the website. Below, I offer a few general thoughts about the project and respond to the specific requests you provide.

Your work resonated with me because a number of the issues your team is addressing overlap with those of the Math 3Cs project. This project, directed by Hendrik Van Steenbrugge, Heidi Krzywacki, and myself, examines teachers' use of print and digital resources in Finland, Flanders, Sweden, and the U.S. While our study was designed to examine how cultural traditions and practices in each region influence the use of resources, we did not anticipate that cross-cultural research would play such a central role in the methodological aspects of the study. We have learned that in order to work across cultures and analyze data from different regions, we need to develop what Paul Andrews (2007) refers to as *prerequisite intersubjectivity* among the team members. Andrew's (2007) reflection on the functioning of a cross-cultural team of researchers analyzing mathematics teaching in five European countries, reveals that although at the beginning of the project their team assumed a shared understanding on central concepts, it took several months to develop prerequisite intersubjectivity and to make significant progress.

We have also been influenced by Osborn's (2004) discussion of different types of equivalences in cross-cultural research and Clarke's notions of validity when doing cross-cultural research. These ideas are summarized in a brief table below.

<b>Osborn's (2004) Equivalences based on Warwick and Osherson (1973)</b>
Conceptual equivalence: identifying/developing concepts with equivalent meanings at a deeply contextual level.
Equivalence of measurement: identifying whether concepts have equivalent salience in each context and developing equivalent indicators for the concepts.
Linguistic equivalence: identifying terms that have equivalent meanings to participants and researchers.
<b>Clarke's (2013) validity – comparability dilemma's</b>
Cultural-specificity of cross-cultural codes
Deciding between inclusive categories to maximize applicability across cultures vs. distinctive categories that capture explanatory detail
Cultural specificity of cross-cultural evaluation criteria
Form vs. Function: confusion with forms that appear equivalent but serve different functions in different cultures.
Linguistic preclusion: linguistic norms influence aspects of discourse that go beyond immediate responses

Omission: Researchers who lack appropriate cultural terms or concepts may omit notice of critical phenomena
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Disconnection: activities and terms are separated from their local meaning
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We have tried to address these issues by using insider-outsider subteams to undertake analysis and by making our understanding and language explicit to the extent that we can. One of the challenges we confronted which may overlap quite a bit with your team's work is how we understand the terms we use to describe different aspects of teaching. Below is a brief description of how we are addressing language issues.

### **Handling of language issues**

The team communicates in English, as all team members have mastery of English. That said, we are learning that commonly used terms have different meanings. For instances, words that are seemingly straightforward in their translation, such as, "instruction," have different meanings when translated into different languages. One U.S. team member used the term instruction to refer to what was happening throughout a lesson under the teacher's guidance and orchestration. A Swedish member of the team translated this term into the Swedish as Genomgång, which refers to the part of a lesson when the teacher goes over or reviews material. We have discovered through our discussions that the English tendency to create nouns out of the gerund forms of verbs (e.g. *teaching* from *teach*), is not common to other languages, especially Swedish and Finnish, which may use words with separate roots and meanings for the noun and verb forms of a practice. In general, we have found that terms like *teaching and learning* do not always translate with similar meanings.

To address this challenge, we have begun a multilingual glossary of key terms used by the research team. Each member will identify central terms related to teaching mathematics in their own language and describe their meaning using English languages. We will continue to add to this document and engage in ongoing discussion about their meanings. We have also agreed that we will not limit ourselves to English terms. It is possible, even likely, that some meanings we wish to express cannot be captured in the English language. For instance, the Russian term, *obuchenie* does not have an accurate English translation. The Finnish term *opetus* and Swedish term *undervisning* have similar meanings to the Russian term. Both refer to an activity or interaction in which teachers and students are joint participants and are sometimes translated to English as *learning* and other times as *instruction*.

With this experience in mind, I was struck by several aspects of **your template for reporting issues that emerged when translating DAD concepts into other languages**. I think it is extremely important to document the translation process and identify when terms are easier or harder to find equivalents for. Still, I have a few questions about the process. First, our experience working with insider/outsider teams leads me to ask how many team members are involved in the translation process (for each language) and whether the translations have been checked/piloted with teachers or researchers familiar with the language, but not the concepts to test the validity of the ideas in the particular language. Second, and related, even when it was easy enough to find comparable terms, for various concepts, I wonder it is possible that meanings can be lost given cultural assumptions and practices around the use of those terms or

teaching itself. In other words, it seems that language is the tip of the iceberg. How the ideas that linguistic terms are understood and used in different contexts are very important to uncover.

### **References Used/Recommended**

Clarke, D. (2013, February). The validity-comparability compromise in crosscultural studies in mathematics education. In Proceedings of the Eighth Congress of the European Society for Research in Mathematics Education (pp. 1855-1864).

Andrews, P. (2007). Negotiating meaning in cross-national studies of mathematics teaching: Kissing frogs to find princes. *Comparative Education*, 43(4), 489-509

Osborn, M. (2004). New methodologies for comparative research? Establishing 'constants' and 'contexts' in educational experience. *Oxford Review of Education*, 30(2), 265-285.