CAPTeaM: The five phases of the study

Our project, (CAPTeaM: Challenging Ableist Perspectives on the Teaching of Mathematics) aimed to establish a partnership between two research groups (UK: led by Elena Nardi, PI; Brazil: led by Lulu Healy, co-I) in order to combine Nardi’s approaches to investigating and transforming mathematics teachers’ pedagogical and epistemological beliefs and Healy’s research with mathematics learners with disabilities. In this one year project – of what we envisage as a longer-term partnership – we developed and trialled materials that encourage teachers to reflect upon the challenges of teaching mathematics to students labelled as disabled and who may have previously received their education in special schools or classes. We collected data from these trials in both countries and our analyses suggest ways in which research, teacher education and practice can support teachers in overcoming these challenges. We disseminated project materials and results in teacher workshops in both countries, and elsewhere, and we presented results in national and international conferences which were then published in conference proceedings. We are currently preparing articles for publication and are continuing with project dissemination and impact generation activities in more teacher workshops. We are also preparing the next application for a three-year BA IPM grant that will build on the remarkable momentum generated by this first year of CAPTeaM.

We note that in this report and throughout the project we endorse the following definition of ableism: “... a network of beliefs, processes and practices that produces a particular kind of self and body (the corporeal standard) that is projected as the perfect, species-typical and therefore essential and fully human. Disability then, is cast as a diminished state of being human.” (Campbell, 2001; p.44). With this in mind, CAPTeaM has aimed, not only to acknowledge, but also to work with practising and future teachers towards challenging the ableist assumptions that currently mediate our interpretations of mathematics learning and our practices as educators of mathematics.

The CAPTeaM research design enacts the reciprocity principle of the BA IPM Scheme and was carried out in five phases:

- Phase 1: Preparatory work towards Brazil to UK visit
- Phase 2: Brazil to UK visit; task design, pilot
- Phase 3: Preparatory work towards UK to Brazil visit; data collection
- Phase 4: UK to Brazil visit; data analysis planning
- Phase 5: Data analysis and dissemination

Note: During Phase 5, an additional second visit of the co-I (from Brazil to UK) took place. See below our more elaborate account of each phase.

These five phases have involved the design of tasks aimed at providing opportunities for pre- and in-service teachers to reflect upon issues related to the inclusion of disabled mathematics learners in their classes. In Phases 1 and 2, two types of tasks (Type I and Type II) were designed and trialed. We outline the project activity during each one of Phases 1 to 5 in what follows.

During Phase 1 both teams: consolidated familiarity with each other’s prior work; finalised arrangements for the reciprocal visits; identified cohorts of participants; planned the visit to the UK of Healy & Fernandes; drafted Task designs to be finalised during Phase 2 and used towards data collection on both sites during Phase 3.

During Phase 2 four tasks (three of Type I and one of Type II) were designed and piloted with small groups of participants (pre- and in-service teachers) in Nardi’s (UEA) and Healy’s (UNIAN) institutions.

The first step in the design of the Type I tasks involved members from the Brazilian team in selecting episodes of mathematical interactions between students and teachers from the database of video evidence collected in the different studies of the research programme Towards an Inclusive Mathematics Education (www.matematicainclusiva.net.br) that Healy has been leading in Brazil for several years. The aim was to locate episodes representative of the mathematical practices associated with particular forms of interacting with the world – practices of learners who see with their hands and ears, who speak with their hands, whose visual memory is more efficient than their verbal memory, etc. We opted for episodes involving the use of interesting and valid mathematical strategies, but in which the properties and relations were expressed in unconventional or surprising forms.
Using the task design approach devised and deployed by Nardi and her team, each episode was inserted as a video clip into a brief narrative about a fictional mathematics classroom. We then invited the participants to assume the role of the teacher of this class and evaluate the interactions of the disabled students that were presented in the video clips – first individually and in written responses to a set of questions and then in a group discussion (which we also video-recorded).

In the tasks of Type II, which aimed to provoke reflections about how access to mediational means differently shapes mathematical activity, participants worked in groups of three. Two members of the group were asked to solve a mathematical problem whilst, temporarily and artificially, deprived of one of their sensory or communication canals. The third member of the group filmed their interactions. A group discussion of their experiences followed.

We note that during Phase 2 there was a minor digression from the proposed plan: only one of the two Brazilian team members scheduled to participate in the UK visit (co-I Healy) did so physically. Team member Fernandes was unable to travel (due to an accident that resulted in lack of mobility for the duration of Phase 2) participated virtually in the Phase 2 project activities. Funds saved from this digression from the original plan were deployed for a second visit by the co-I during Phase 5.

The Phase 2 visit to the UK took place during the final weeks of the Autumn Semester so that Healy could contribute to the UEA’s Public Seminar programme, PGCE programme as well as discuss the project with students from UEA’s doctoral, MA and BA programmes as guest lecturer. The project’s ethical approval application was also completed during this phase. Application to UEA’s Research Ethics Committee mirrored those previously produced by Nardi and UK team member Biza who are currently involved in a project of analogous research design.

During Phase 3, data was collected in Brazil and the UK from a total of 81 pre- and in-service teachers (60 from Brazil and 21 from the UK) who completed the four tasks in a three hour session. Data consists of: written responses to the Tasks; audio / video recordings of small-group and plenary discussions of the responses. Data collection was carried out in February in the UK and in March in Brazil, at the start of the southern hemisphere’s new academic year. Data analysis was initiated right after and has been ongoing in Phases 4, 5 and beyond. It is being conducted on each site, first separately and then collectively in accordance with agreed procedures that merge the approaches used in previous studies by Nardi, Healy and their collaborators. As the data is in English and Portuguese, selected translation (of texts, nuances and contextual details) is necessary.

During Phase 4, Nardi & Biza visited UNIAN for the main purpose of analysing the collected data and preparing dissemination of findings. Mirroring Phase 2, reciprocal lectures and seminars were offered to the respective programmes at UNIAN as well as to associated research groups and post-graduate programmes elsewhere in Brazil (at UFRJ, the Federal University of Rio de Janeiro which also hosts a group of researchers, led by Dr Claudia Segada, with interest and expertise in research into teaching of mathematics to disabled learners).

During Phase 5, project activity focused on data analysis, generating outputs for dissemination and further impact generation activity. These included workshops to cohorts of teachers on both sites and conference presentations (BSRLM in the UK in June and submission for presentation at VI SIPEM in Brazil in November). At all events (seminars and teacher workshops) in both sites (UK, Brazil) evidence was collected of the impact generated by teacher participation in these. Further, teacher reflections and propositions related to subsequent (beyond this first year) phases of the project were also collected and are currently informing the design of a scaled-up version of CAPTeaM (BA IPM bid, in preparation for submission by February 10th, 2016).

We note that during Phase 5 there was a second, slight digression from the proposed project activity: participation at PME39. This digression was due to distance/cost reasons (it was held in Hobart, Tasmania, access to which was beyond the financial means of this project) – as well as timing (it was held in July, at a time that we deemed too crucial for reaching out to key user communities, teachers, prior to the end of the school year in the northern hemisphere). We see our extensive dissemination activity during and beyond the project dates as compensating for this slight digression from the initial plan. We are also currently completing a PME40 paper for submission. This is due on January 15th, 2016.