CAPTeaM: Impact

We have collected a substantial volume of evidence in the format of written responses, video recorded interviews, teacher educator notes and diaries and email communications that evidence the impact of CAPTeaM research activities. In addition to these qualitative datasets, we are also collecting quantitative data with a survey instrument (questionnaire with closed and open-ended questions) we have developed in collaboration with the Grupo de Apoio Estatístico (Group for Statistical Support) in UNIRIO (Universidade Federal do Estado do Rio de Janeiro), a higher education institution in Brazil in which project collaborator Bruna Moustapha Corrêa coordinates a mathematics education research group. Analysis of data collected via this instrument is ongoing.

The major benefits from CAPTeaM concern the mathematics teachers in Brazil, UK and beyond who participate in data collection and those who participate in the project's dissemination activities. Our research findings and participant testimonials elaborate these benefits. The partnership is also beneficial for the research groups (and respective institutions) at UEA and UNIAN, as well as at the institutions that team members are affiliated in such as UFRJ, UNIRIO in Brazil and King's College London, in the UK, in very substantial ways. In the UK, CAPTeaM has added a valuable third strand (Inclusion) to the MathTASK project, with the other two being Mathematical Reasoning and Classroom Management. In Brazil, and the UK, CAPTeaM has offered Healy and her longstanding research team insights on professional development gleaned by the UK team members, contributing to the process of disseminating the multisensory approaches beyond the Brazilian classrooms in which they were originally employed. The Brazilian team – whose expertise in research and development work in teaching mathematics to disabled learners is very substantial – has gained from the opportunity to interact with teachers in a different international context and to explore how different institutional constraints and affordances shape teachers' views about the teaching and learning of mathematics. Across the two teams, at least nine doctoral students (5 in the UK and 4 in Brazil) have benefited directly from involvement in the project as Research Associates. Analogous claims apply to faculty contributing to the mathematics teacher education programmes on all sites.

Suitably anonymised samples of the project materials are available on the CAPTeaM website, which also contains brief videos that present nutshell descriptions of the project's activities in British Sign Language. This mirrors the respective parts of the Brazilian site, www.matematicainclusiva.net.br, which offers such descriptions in Portuguese Sign Language.

CAPTeaM has generated the academic impact described in the Research Activities and Publications section of this website. There, we describe the benefits that are specific to the ongoing research programmes of the two main research groups involved in the project (at UEA and at UNIAN) that this partnership has been generating, as well as research groups at other project sites. These benefits pertain to pre- and in–service mathematics teachers on all sites as well as elsewhere where CAPTeaM analyses and results are being disseminated (see also Workshops and Seminars). Key networking during (and expected to continue after) the project includes the contact we established also with disabled teachers of mathematics, particularly Mr Malcolm Sinclair (mathematics teacher of the deaf) with whom we also worked closely towards the filming of the British Sign Language videos of the website and whose network of disabled learners, and their carers and families, have provided support – and inspiration – for the proposal for the 2016-2020 phase of CAPTeaM.

Indicatively, we sample below from the *Reflections & Evaluation* form that workshop participants have been filling in – and which now has transformed into the aforementioned survey instrument, made available to participants at the end of each event via a QR code.

One of the questions on the form is: "Have the activities in this workshop helped you reflect on your teaching practice? If so, In what ways?". Consistently responses have acknowledged the value of the workshop activities and have included comments such as the following:

"Yes. We rarely have enough time to consider pupils with these kind of issues. It is a worry that our attempts to 'include' pupils in mainstream education often excludes them from many things and does not provide an opportunity for them to progress academically at a rate that they are capable. I will go back to class and try to give the pupils more input into their learning to ask them what they need to access the curriculum."

"They made me realise how difficult it is for disabled students to understand certain concepts. The different activities used in the session gave me a few ideas on what strategies I could use with my students and to better explain certain topics."

"Yes, they have helped me realize how deaf and blind people learn Mathematics, which restrictions and difficulties they encounter. Based on this, I have benefitted on how to adjust my maths teaching I order to incorporate all these pupils in mathematics learning. The videos we watched, the practical activities we had in the class, the discussion that we had as well as the tool of MusiCALcalorida have significantly made me reconsider and reflect on my teaching practice".

"Importance of communication. Task 1 – vividly remembered how students rely heavily on meaning of eg. "X" and the importance of "Yes/No" affirmation. Geometry (eg. Pyramid) –3D geometry without always working at Net 1. Acting swiftly to attune and value."

“It helped me understand how students understand Mathematical ideas in a concrete way and how their understanding itself can influence and inspire the lesson. It made it even more obvious how pupils need to go from concrete, to pictorial, to abstract in order to master mathematical ideas and how the ones that did, demonstrated higher order thinking and “out of the box” explanations.”

“Language teaching for deaf students in Primary and High schools. Specific maths language using sign language can be difficult to demonstrate if students have limited understanding in language for example – sign for number and digit are same signs. Visual aspects for deaf students are important as mentioned in the groups today.”

“Always look for different ways to include young people with disabilities be pro-active. Value their contribution – their insight based on their experience is different to yours–You could well gain from understanding their perspective (André – squares on top of each other to describe the pyramid).”

“Yes. It is very interesting to give information without speaking and writing. I should create a new way to communicate with my student.”

“Yes. Maintaining emphasis on an inclusive classroom–access/resources made available for learners to be taught together.”

“Yes, I’m now asking how can I use/develop teaching aids for the disabled students in my class. – Re-thinking my go to strategy for the more commonly encountered disabilities.”

“Yes these activities helped me know in depth about the students. It helped to support the mathematical learning of students who have disability in classrooms. It helped to see the issues of different situation from different point of view.”

“Yes definitely. I would like to teach in a visual way and this emphasised this and how dependant I am upon pupils that are able to see my teaching. How can I adapt this for VI pupils, or even just pupils who do not learn so well from visual methods! Can blind pupils have a visual learning preference? Or do they have to be auditory/kinaesthetic learners? They seem to need to have to have a good memory/concentration span.”

“Yes. The task with a mute teacher and blind learner was particularly interesting as it forced us to use different modes of communication than normal.”

“A very interesting and informative activity, much like the video! Certainly, if I had a disabled student in my class I would need some support (a consultant, etc.). But the first activity when we stepped into that position it made me think and develop techniques that brought me one step closer to understanding these children.”

“Yes, but I don’t think that I could comply to such a task without specific training. It was very nice to see a different viewpoint though. It was another representation that should be adopted in teachers’ education.”

“The activities helped me reflect on my teaching practice; think of ways to help disabled people to learn mathematics; and also make use of what these [students] bring to the whole class.”

“The truth is that I do not have experience in teaching students with special needs. However, the activities in this part highlighted important points to think about, that could be used for teaching concepts even to students without special needs, as it showed that they recognized different points from the usual practice.”

“Very much, as I realized that teachers need to know the mathematical concepts very well so they can find alternative ways to explain various concepts. Some things which are obvious and can be easily explained to the students (without special needs) can be very difficult for students with special needs.” “This session gave us the opportunity to venture out of the narrow and limited context in which we see the teaching practice, especially for the subject of mathematics.”

"I don't have a lot of experience with children with special needs. So what this session made me think was whether my teaching practices take into account the diversity of students, not necessarily at the level of the limited physical abilities, but at the different perceptions students have.”

“Yes, of course. I thought about how relative are mathematics in their formalistic side and maybe that the descriptive and non-formalistic teaching approach can be more efficient.”

“Yes. To understand and realize the capabilities and the approach different from the conventional methods, definitions and descriptions in teaching. Also, [it helped me] not take for granted what I see, or what is perceived by the curriculum. As the students (not only the students with special needs) might not perceive them in the same way.”

“[You] contemplate on the diversity of strategies that are developed between people with their five senses and the others with reduced [senses].”