How far can we go?

Benefits of International Collaboration

How the project came about

This project came about through cooperation which developed at recent ASE conferences in Sheffield and Northampton.

We are members of the ASE international Group for a number of years and had attended ASE conferences during this time. We have spoken to international members at various conferences to elicit their views on the ASE offering for its international members. We wanted to develop our international experience and translate it into a project.

Photo by Joshua

How the research was designed

The research was designed over the course of a year through a series of online meetings between the three members of the team. Questionnaires for teachers, students and teacher educators were discussed and improved. As the project took shape it was decided that the focus would be on three schools, and we worked with a teacher educator to facilitate this.

The Research questions

- The research questions focused on pedagogical changes in science education in secondary schools and inquiry learning.

What we observed

Small laboratories, students are sitting close together. Most labs do not have gas and some teachers use spirit burners for heating. The concept of whole class practical is very difficult to achieve. Even demonstrations from the teachers are hard for a number of the students to see clearly.

How the research was carried out

- 11 teachers were interviewed from various schools
- 12 teachers completed questionnaires
- 79 students completed questionnaires

Focus of students' questionnaires:

How did they learned science before and during the COVID-19 pandemic; how science experiments were carried out before, during and after COVID-19; experience of using video conference visit to science establishments; and using online science experiments

Teachers' questionnaires: experience of teaching; teaching methods before and during the pandemic; experience of online science experiment; science experiments taught before the pandemic

Data analysis

For this conference, we will only present outcome of the teacher interview analysis.

The data was analysed using thematic and content analyses.

Thematic analysis: studying the data in detail and identifying the themes that emerged to answer our research questions.

Content analysis: helped us generate a numerical representation of the themes from the codes generated. For example, online learning relates to ‘digitalisation of education’ and can include activities such as researching, simulations, interactive and multimedia learning in different forms.

Results: themes generated

- Digitalisation of education and online learning
- Teacher pedagogical knowledge and promoting student-led learning.
- Tailored professional development support for teachers
- Lack of resources for practical work impacting on inquiry learning

What we have learnt

- Collaborative support from lecturers in Sofia university who come to secondary schools to teach science- their previous school as a way to support and promote the interest of students and teachers in science and help with subject knowledge development.
- Teachers attend international competitions with students- and both teachers and students learn from this experience. Some teachers value this as CPD experience through networking more than any other CPDs organised by their schools
- Lack of resources to promote inquiry learning
- How can inquiry learning be promoted and planned for, other than through practical/experiments- depends on teacher pedagogy and knowledge/expertise.
- More experienced teachers are willing to support the less experienced ones
- Culture of respect among teachers especially the less experienced ones who respect the older teachers who may have been their teachers while they were in secondary schools.

Unexpected learning

While girls slightly outperformed boys in science (by two score points) on average across OECD countries in PISA 2018, in Bulgaria girls outperformed boys in science by 15 score points

Amongst high-performing students in mathematics or science, one in seven boys in Bulgaria expect to work as an engineer or science professional at the age of 30, while one in nine girls expects to do so (the difference is not statistically significant)

What can you gain from international experience?

Photo by Al Soot on Unsplash

- Realise that there is more than I way to do something - sometimes better ways
- Understanding that there are many similarities with teachers and students across the world
- Increase in professional knowledge and skills to share ,
- improved motivation,
- Greater awareness of, social history, international literature and world politics

Outcome of our project

The concept of whole class practical is very difficult to achieve due to small laboratories. Our project is currently promoting micro-chemistry and teachers have been experimenting this concept to ensure that students have hands-on experiences.

Phase two of our project will promote this further.

Teachers Resources and opportunities

- British Council Connect Classrooms https://wales.britishcouncil.org/en/connecting-classrooms-through-global-learning
- International LinkedIn groups such as International Educators
- Scientix https://www.scientix.eu/
- International Schools Partnership https://internationalschoolspartnership.com/
- Research document ‘Would a globalized curriculum be beneficial to students?’
- https://www.berkhamsted.com/research/would-a-globalized-curriculum-be-beneficial-to-students/