

TITLE

Mathematics in a multicultural setting

VISION (ASPIRATION AND AIMS)

- to develop a common multi-literacy promoting inclusive and multicultural classrooms
- to increase students' engagement in learning activities

BACKGROUND MOTIVATION STATEMENT

As immigration and other demographic changes increase the diversity in classrooms, there is a requirement to find new ways in which students can participate in activities that bring them together and break down barriers. Technology can assist in this process creating multi-lingual collaborations which provide rich shared experiences and also offer opportunities for students to increase their engagement in schools and gain confidence.

NARRATIVE

“Diversity in this school should be an asset, not a barrier!” These were my words during a heated conversation with one of my colleagues in the Mathematics department. The reason for my outburst had been the topic of discussions for a long time. My school serves a large community with a high level of immigration, which comes with many challenges. A large number of our students speak an additional-language, which means that communication can be problematic and this inevitably compromises their learning. The school has introduced many traditional literacy initiatives with some degree of success. However, I have been feeling that it is time for something different. What if we try to use the “universal language” of mathematics to improve participation and communication across the school?

Using a scheme within the school that encourages improving communication, I offer the idea to the head teacher. He agrees to allocate some time and budget to our multilingual Mathematics project and a team of like-minded, enthusiastic teachers is put together. The idea of the project is to help students across the school develop a “common language” around mathematics. To keep things relatively simple, we decide to focus on percentages and fractions. Our aim is to get all our students to explore authentic questions and challenges which involve these mathematical concepts. The novel and exciting element is that the activities will be informed by research carried out by additional-language students, and they will be worked through in multiple languages.

We start the project by giving personalised support to additional-language students, so that they learn the basic mathematical concepts well. These students work in their own language and also translate the concepts into the first language. Students then use the internet and social bookmarking tools to collect links and learning resources on the mathematical concepts. Students search for these resources from the different countries represented in the classroom and add these resources to the social bookmarking tool so they can be shared with classmates.

The second phase involves the additional-language students explaining what they had found to their classmates through structured presentations and question and answer sessions. My colleagues and I facilitate these sessions, addressing misunderstandings and communication issues.

To ensure all students understand the mathematical concepts, they use an online template created to help them reflect on what they learned and identify further questions that could be answered using percentages and fractions. I create groups that include students from different countries and these groups work on authentic questions like calculating the number of students leaving school with qualifications in

different countries or the relationship between eye colour and gender in the classroom. The groups use the first language and the additional language as necessary. Students record this activity and findings in an online collaborative document (eg Google docs), so it can be shared with the rest of the students.

As a final step, the students use a social networking tool to make contact with a group of students and teachers in the home countries of students in class. They share their experience of multicultural mathematics and ask for some feedback.

At the end of the experience, the students' confidence is visibly higher, as are the levels of interaction and participation amongst the students. Additionally, interest and engagement in mathematics also significantly increase. Because this was a success in the Mathematics department, it is also adopted as a model in other departments.

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TREND/S

Inclusion in practice

Many classes in European schools are now culturally and ethnically diverse. Teachers are becoming increasingly experienced in dealing with diversity and know how to recognise and address inclusion issues when these arise.

Demographics shifts owing to immigration

While the European Union's overall population is projected to increase slightly between 2005 and 2030, the bulk of that increase will come from net immigration. As a consequence, inclusion (of minorities, immigrants, but also with those with special needs and disabilities) is being recognised as a political priority in many countries.

Enhanced professional development

There is a trend of increased emphasis on teacher professional development, in which the use of technology plays an important part. For example, technology is used to create collaborative platforms and communities of practice to bring life to the “hard to teach” and “hard to understand” areas of the curriculum, like MST (Mathematics, Science and Technology), thus engaging students with such crucial subjects.

KEY CONCEPTS

Inclusion, communication, MST, flexibility, literacy

ENVIRONMENT

- the classroom, possibly connected to a network of other schools
- students can access the network from their homes, individually or as they discuss the project with their parents

PEOPLE & ROLES

- students from different cultural and linguistic backgrounds in the same classroom as collaborators and co-investigators
- students and teachers from different cultural and linguistic backgrounds in classrooms across Europe – as a resource
- parents – as an expert resource when required

INTERACTIONS (INCL. PEDAGOGIES)

- focus on communication through MST
- MST literacy
- emphasis on the richness of cultural diversity
- enquiry-based and project-based learning
- active guidance from the teacher
- peer-based learning

ACTIVITIES

- dialogue
- discussions
- research and evidence gathering
- reflecting
- “always-on” communication

RESOURCES (INCL. TECHNOLOGIES)

- network of teachers and classrooms, always on and easily customisable and expandable
- platform for sharing and commenting on content and productions
- digital media creation and editing
- internet and social media tools (eg social bookmarking, social networking tool)