QUESTIONNAIRE FOR MATHEMATICS TEACHERS ANALYSIS SYNTHESIS

The questionnaires were collected from 154 in-service teachers in different parts of the countries, teaching at lower secondary level. This research sample was not representative, researchers in most teams found it difficult to motivate teachers to fill in and submit completed questionnaires. For the aim of this survey, however, representativeness of the sample was not important. What the researchers were looking for were illustrative data collected from practitioners who have, or do not yet have, experience from multicultural classrooms. The findings from the survey are, of course, influenced by the differences in the situation with migrants and minorities in the different countries. While respondents in France and Italy have rich experience with teaching migrant students and thus have elaborated discourse on the topic, teachers in other countries found it harder to formulate their ideas due to lack of hands on experience.

31 respondents came from Austria, 12 from the Czech Republic, 35 from France, 25 from Greece, 79 from Italy and 22 from Norway. The Czech Republic collected their data during in-service teacher training seminars. In Norway questionnaires were sent to teachers in schools in different parts of the country. These were teachers the researchers had collaborated with in different connections (when they came to courses, seminars or workshops, or were doctoral students in their programme). They were asked to distribute the questionnaire to some of their colleagues who could be willing to reply. The questionnaires were also sent to all mathematics responsible teachers in one city in southern Norway and asked for their support to distribute to all math teachers. The team were more successful in getting replies from teachers whom they had good contact with. The many teachers in the city produced only very few replies. One of the headmasters told the team that he would get at least one such request each week which means he would throw most of them in the paper basket in order not to burden the teachers with extra work. In Austria, the questionnaires were handed out to teachers who a) attended in-service teacher training courses at the partner university, or b) who did their pre-service training at partner university, or c) were colleagues at schools where teachers from groups a) or b) teach. This amounted to schools from three (out of nine) provinces of Austria. 53 questionnaires were distributed, of which 36 were given back (31 of which were from lower secondary teachers). In France, the questionnaires were sent to teachers in the region of Créteil by mail, the research team had met these teachers in in-service training, 18 out of these questionnaires were filled, and other 17 questionnaires were handed out to attendants of currently running teacher training course. In Italy, the questionnaire was sent to a mailing list of around 100 math teachers who are the members of a professional association in Tuscany. Most of them are among the respondents. To get, at least, a small piece

of information about other Italian regions, a few questionnaires were also emailed to individual teachers who are used to co-operate to the Italian team for national projects.

Qualification of respondents differed in the countries depending on the system of pre-service teacher training. While all teachers in Austria and France and majority of Greek teachers (68% of respondents) teach only Mathematics (with the exception of one French teacher who is also in charge of a training for students discovering the professional world at the end of lower secondary school), respondents from other countries have qualification to teach other subjects as well. In Italy, all teachers teach Mathematics and Science at lower secondary school level; other countries support two or more subject qualification. The most frequent combination in Greece is Mathematics with Geography, in the Czech Republic Mathematics with one of the natural sciences (biology, chemistry or physics). Norway reports to have the highest proportion of multi-subject qualified respondents (14 out of 22 teach more than 4 subjects and mathematics, 18 out of 22 respondents teach more than 3 subjects and mathematics).

In all countries, teachers with a wide variety of teaching experience answered the questionnaires. Out of the respondents, Norway had teachers with the longest average length of practice of 21 years, while France with 10 years the shortest teaching practice. The Norwegian team confirmed that the average age of Norwegian teachers was high and the country was at the brink of enter of new generation into the teaching profession.

Out of the respondents, only Italian teachers reported to have training in multicultural issues in greater numbers (19% of respondents during their undergraduate studies, 14% as part of their in-service training within last year and 24% before that). For the rest of the countries, usually just one or two of the respondents in the country gave affirmative answer.

Though the average percentage of students with a migration background varies in the participating countries, depending on school size, school location, socio-economic or cultural background etc., an overall majority of teachers have already encountered such students in their classrooms. The majority of respondents from all countries come from urban areas (with more than 10000 inhabitants). Considerable number of respondents come from the country capital cities (Vienna – 84%, Prague – 42%, Créteil, Paris – 100%, Athens – 56%) while most Italian respondents come from Tuscany – 76%.

The average number of migrant students in schools for the Czech Republic, Greece and Austria is about 12%, for Italy 13% and Norway 8%. In France, it is not possible to ask about pupils' mother tongue or origin. The system speaks of pupils newly arrived to France (ENAF). The questionnaire for French teachers was therefore adapted, using the French term instead of the term migrant pupils. The average of pupils newly arrived to France in the classes of French

respondents was 3%.

In general, there are big differences among individual schools in each of the countries. In all of them some respondents report to come from school with no migrant student at all (the Czech Republic, Austria, France, Italy, Norway) but at the same time from schools with almost half (or even more than half) of their pupils migrant or cultural minority (Austria 45%, Italy 65%, Norway 40%).

With the exception of the Czech Republic and France where just one third of teachers (CR) or less than half (FR) have prior experience with teaching mathematics to minority students, all countries have a majority of respondent teachers who have this experience (ranging from 83% in Austria to about two thirds in Italy, Greece and Norway). The majority of these teachers report to have encountered problems while teaching these students (all in Norway and Czech Republic, about two thirds in the other countries).

When trying to overcome these difficulties, teachers from Greece report they used ICT (Geogebra), worksheets and visual aids, Italian respondents used books and papers, teaching units (developed by mathematics education researchers), math teacher training programmes offered by the Ministry and local entities, ICTs, vocabulary of symbol names, textbooks. Austrian teachers looked for help on internet websites, especially those focusing on CLIL. French teachers also used Internet resources for primary school, textbooks, ICTs, teaching units (given by colleagues), dictionaries, or asked another pupil to translate. Internet and ICT seem to play an important role when dealing with minority pupils in lessons in all countries.

Sharing of the encountered problems was reported only by a minority of the respondents: in Austria only 1 respondent shared their experience, one half of teachers in Norway and about one third in the other countries. This suggests that more cooperation and communication might be needed. Austrian teachers report to have been most supported by their authorities (more than half of the teachers who had encountered difficulties when teaching migrant pupils). Only about one quarter of Greek teachers report to have received this kind of support. In other countries the same help was mentioned by about one third of the respondents. The form of this support was different in the countries. Austrian teachers were offered in-service training for work with migrant students, Czech and French authorities offered help of psychologist or social worker. Italy offers L2 (curricular and extra-curricular) classes, intercultural board for school inclusion, additional funds, cultural mediators, literacy courses, school facilities, additional teaching hours. French teachers speak of help of colleagues teaching FLS (French as a second language). One Czech and one French teachers report the student was moved to another class: the Czech teacher does not specify, the French teacher speaks of a special structure class.

Teachers named a variety of issues that they encountered while teaching maths in multicultural classrooms. The benefits reported by the teachers are cultural

enrichment for everybody, overcoming of barriers and prejudices, growth of tolerance, growing awareness of differences between countries as far as teaching materials, punishments, interpersonal relations at schools are concerned, general improvement of all in mathematics (as the teacher had to pay more attention to how they explain things, used new didactic approaches and different cultural activities for the advantage of the whole class), knowledge interchange and discovery of new methods for calculation.

Teachers speak of the following changes in their teaching strategies: inclusion of more individual and group work and less frontal teaching, more learner centred approaches, more collaboration and peer support, more homework and generally slower pace of instruction, simplification of language and grammar (clearer instructions and more explanations), use of more visual material and aids, graphs, diagrams, schemes, illustrative examples. The Italian respondents also focus on etymology, history and translation of mathematical terms to make it more comprehensible. Teachers speak of careful analysis of materials to be used in their lessons and more monitoring and analysis of pupils' difficulties. The teachers speak of more differentiation in their instruction, e.g. Italian teachers report on using simplified worksheets and tasks for minority pupils. The description of changes in teaching strategies strongly suggest that these changes were helpful also for special needs pupils and low achievers.

As far as supporting materials are concerned, 85% of all respondents would appreciate information on cultural backgrounds of their minority pupils and concrete didactic units from various cultural backgrounds. There are big differences in preferences of respondents in different countries, information about cultural background seems to be very important for Greek respondents (88%) but also Italian teachers (with 70% of yes answers is the most asked for material support in Italy) and little important for Austrian respondents (only two out of 31 respondents).What the Austrians ask for most are concrete didactic units (58%). Overall, a slightly lower but still considerable proportion of all respondents (75%) would find also supporting pedagogical documents useful. Supporting pedagogical documents are most asked for by the French teachers (86%), while Czech and Austrian teachers are sceptical to their usefulness (asked for only by 33% of Czech respondents and 26% of Austrian respondents).

The respondents also proposed other materials that they would find useful in these situations. Teachers asked for bilingual maths and science dictionaries, language support materials and L2 courses for minority pupils, adapted textbooks (easily readable, generally accessible, with a lot of images on fundamental disciplinary concepts, presenting daily life contextualized activities), visual aids, presence of assistants in the classrooms, ICT in the classroom, interactive boards and internet access, e.g. to access websites with mathematics in pupils' native language, vocal translator software and video-cameras. They also asked for a reduced number of pupils in the classroom,

for multicultural training and information not only about the culture but also about background education of the pupils, information on syllabi, national programmes and standards and learning/teaching styles in pupils' native countries.