The MUSE Training programme: a final evaluation

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Angela Little and Pat Pridmore

Institute of Education
University of London

List of Contents

The Muse Project: final evaluation

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1.0 Introduction

The overall aim of the Multigrade School Education (MUSE) project is the development and evaluation of an innovative training programme for teachers in multigrade schools in Finland, Greece and Spain through open and distance learning (ODL).

The innovative training programme has three foci:

> Methodological approaches to multigrade teaching and practice
>
> The use of ICT in the classroom
>
> The design of cross curricula applications and projects (based mainly on the use of ICT)

At its conception the training programme was considered to be innovative, for*, inter alia*, the following reasons:

- It uses ICT to support the professional development of teachers who work in multigrade schools in geographically isolated areas
- It seeks to involve teachers in the identification of their training needs
- Its development is intended to be 'participatory' is so far as the teachers are encouraged to reflect on the training content and process and to feed this information to the designers and evaluators of the content and structure
- It involves partnerships between schools and higher education institutions in each of the three countries
- It involves partnerships across three countries between teachers and teacher trainers
- It involves an institution in a fourth country in the formative and summative evaluation of the training programme

Although the long-term impact of the training programme is intended to improve the quality of student learning in multigrade classes, the main focus of this evaluation is the assessment of the impact of the training programme on the teachers.

Partners and Key actors

Nine partner institutions and 15 key actors were involved in this process in four countries.

The schools and school teachers were

> *Finland:* (i) Veikko Vionoja primary school
>
> > (Reeta Puskala, Sari Van Schaik, Mauri Niemisto, Maila Koivumaki, Tuula Kellokoski

(ii) Vintturin-Tastulan primary school
(Leena Harju)

Greece: Salakos primary school
(Dimitris Zorzos)

Spain: C.P.R. Fields of Tarifa, Spain
(Manuel Quilez Serrano, Juan Baquero Perez)

The teacher education institutions supporting the training were:

Finland: The Chydenius Institute
(Eila Aarnos, Juha Paasimäk)

Greece: The University of the Aegean
(Kostas Tsokalides, Alina Konstantinidi)

Spain: The University of Cadiz
(Raquel Rodriguez, Monica Lopez, Maria Jose Betanzo, Carmen Pilar)

The institution with special responsibility for the content and ICT-based delivery of the training was located in a school in Greece:

Ellinogermaniki Agogi (Michalis Orfanikis, Sofoklis Sotiriou)

The institution with special responsibility for the evaluation of the training programme was the Institute of Education, University of London (Angela Little, Pat Pridmore)

The institution with overall responsibility for the coordination of the programme was the University of the Aegean (Kostas Tsokalides).

We are very grateful to all members of the team who have contributed to this final evaluation report in various ways.

2.0 The evaluation: style, scope and methods

2.1 Style

The evaluation style chosen for evaluation was ‘participatory’ and ‘user-centred’. This implied a qualitative and continuous approach, supplemented with quantitative information where appropriate. The evaluation style chosen by the evaluators was consistent with the pedagogical style chosen by the trainers. While teacher educators worked closely with teachers to jointly develop and implement the training programme, so the evaluators worked alongside the teachers, teacher educators and programme designers to jointly develop and evaluate the programme. A detailed evaluation plan was finalised in September 2003, available on the MUSE website (http://www3.ellinogermaniki.gr/ep/muse/).

2.2. Scope

In the original project proposal (dated 2002) it had been suggested that the impact of the in-service training programme would be evaluated by assessing**:**

(i) Teachers' engagement with the new model of in-service training
(ii) Teachers' ability to design and implement cross-curricular teaching plans, projects and activities that are relevant to their specific school environment and use ICT
(iii) Teachers' attitudes to the new model of multigrade pedagogy.
(iv) Students' achievement using the new model of multigrade pedagogy in the classroom.

However, in the course of the development of the project two additional features were added and one of the above modified. Consistent with the assessment of impact was the need to assess the practices of multigrade teaching in the schools before the training began and to understand the context in which teachers and students were working. This is referred to below as the training context. And consistent with the teacher-centred approach was the need to evaluate the extent to which teachers were involved in the relationship between the needs analysis (WP2) and the initial development of the content of the training programme (first stage of WP3). The modification to the above list (i) – (iv) was to item (iv). While the partners agreed that the long term goal of the training programme was the improvement of learning among students in multigrade classes it also became clear that any systematic assessment of this would be impossible within what was already a complex project, implemented by a small number of teachers.

2.3 Methods

The main evaluation methods used to generate evidence to assess each of the above were:

(a) The training context: observations, interviews and documentary evidence by evaluators, teacher educators and teachers, following formats and check lists suggested in the Evaluation Plan www://www3.ellinogerminaki.gr/ep/muse/

(b) Training needs and training content: a self report evaluation by teachers on the likely relevance of proposed training content and suggestions for additional content

(c) Teachers' engagement with the new model of in-service training: self-report evaluations by teachers

(d)Teachers' ability to design and implement locally-relevant cross curricular teaching plans using ICT: observation and self report

(e)Teachers' attitudes to the new model of multigrade pedagogy: interviews and end of project self report

Formats and checklists used to guide the collection of evidence are provided in the Evaluation Plan V4 (Sept 2003)

3.0 The training context: systems, schools and teachers

In this section we describe the educational context within which the MUSE project was implemented. MUSE teachers work in schools and within systems of education that vary across the countries of the European Union. For each of our three countries we describe system characteristics, project school characteristics and the backgrounds of our project teachers. These accounts draw from the case study material collected in Finland (Annex 1), Greece (Annex 2) and Spain (Annex3).

3.1 Finland

3.1.1 System

3.1.1.1. Extent of multigrade teaching

With only 15-17 inhabitants per kilometre Finland is sparsely populated. In 2000, 1279/4985, some 26% of schools were multigrade. These schools are small, usually with less than 50 children. Seven per cent of children attend multigrade schools and 19% of the teachers work in them (Paasimaki, 2003). Continuing decreases in the birth rate, increases in rural-urban migration and financial pressures in municipalities have led to a decrease of 3.4% in the proportion of multigrade schools over the period 1996-2000 (from 29% of the total number of schools in 1996 to 25.6% in 2000). Nonetheless the proportion remains very high and the needs of teachers great.

3.1.1.2 National curriculum

Schools in Finland are currently undergoing considerable curriculum reform. The previous curriculum framework established by the National Board of Education was formulated in 1994. The new framework will be implemented in grades 1-9 from 2006. The new curriculum framework is more detailed and directive than its predecessor.

> It defines the aims and key contents of different subjects and thematic entities, and provides guidelines concerning student evaluation. The objective is uniform basic education (National Board of Education website September2004)

The framework is to be used for the construction of local curricula which will normally be undertaken by the municipalities. Thematic entities cross-cut curriculum subject and content and are described as 'operating principles that help define the operating culture of schools, as well as prioritisations that overstep borders between different subjects and help make teaching more unified (National Board of Education website Sept 2004) They must be taken into consideration in teaching all subjects and, in Grades 1-9 are

- personal growth
- cultural identity and internationalisation
- communication and media skills
- participatory citizenship and entrepreneurship
- responsibility for the environment, well-being and a sustainable future
- safety and transportation
- man and technology

Figure 1 Nationally prescribed subjects and hours, by grade, Finland

Subjects	1	2	3	4	5	6	7	8	9	T
Finnish language	14		14			14				42
A-language			8				8			16
B-language								6		6
Mathematics	6		12			14				32
Environment										
Biology and Geography		9			3		7			19
Physics and Chemistry					2		7			9
Health education							3			3
Religion/Ethics	6					5				11
History and Society					3		7			10
				26					30	56
Music				4-			3-			
Art				4-			4-			
Handicrafts				4-			7-			
Physical education				8-			10-			
Household education							3			3
Pupil´s counselling							2			2
Flexible Zone							13			13
Minimum hours for pupil	19	19	23	23	24	24	30	30	30	222
Non compulsory A-language					(6)		(6)			(12)

Figure 1 is taken from the curriculum framework. The apparent zeros in some cells indicates flexibility in the distribution of time. For example there are 6 hours per week for mathematics for Grades 1 and 2. This total can be spread across Grades 1 and 2 in a combination chosen by the school. Similarly, the 12 hours designated for grades 3,4 and 5 can be spread flexibly; and the 14 across Grades 6-9.

The reader will note that the national guideline is organised by subject and grade. In multigrade teaching, there can be a different number of hours per week in some subject areas, within the same classroom, to cater for different year groups. It is also possible to re-arrange the teaching hours for different subjects over the school year. It is also possible within the curriculum to define learning hours for a multigrade teaching class as learning units, without stipulating for which year group. However, teachers are advised that this reorganisation of the curriculum must be in accordance with section 11 subsection 3 of the basic education statute.

3.1.1.3 Teacher training

Despite the widespread extent of multigrade schools, and the numbers of teachers likely to find themselves in multigrade schools, training for teaching in multigrade schools is limited to two weeks during initial teacher education. Course CS0336 is a two-week course in the practices of multigrade teaching

> Student teachers get acquainted with multigrade teaching, multigrade curriculum and with differentiating and individualising of teaching in multigrade schools with less than 50 pupils. Methods are observing, participating to planning and evaluating, actual teaching and seminars (quoted in Passimaki, 2003: 68: cf. Annex 1)

The Chydenius Institute is currently seeking approval from the National Board of Education for an in-service training course of 3 credits for teaching engaged in multigrade teaching in pre-schools and grade 1 of primary.

3.1.2 The MUSE schools and teachers

3.1.2.1 ***Veiko Vionoja***

The Veikko Vionoja school, named after a Finnish painter, is located in Ullava in the middle of Finland, about 50 km from Kokkola. Of the 62 pupils enrolled in 2003, 41travel to school by taxi. Others live so close to the school that they walk or cycle.

3.1.2.1.1 Human Resources

The school has four regular teachers, including the headteacher. Between them they teach the six grades of primary school. Pupils are admitted to the first grade of primary school at age 7. Although this starting age for the primary stage is late by European standards, some pupils attend a pre-school attached to the school, from age 5. Attendance at pre-school is non compulsory.

In addition to the regular class teachers there are several other staff. An additional teacher is assigned to work with children with 'special needs'; there are four classroom assistants, and four persons with responsibility for meals, transport, nursing and the building.

The staff complement is shown in Figure 2. The single pre-school teacher teaches two ages. The six primary grades are divided into 3 classes combining consecutive grades.

Figure 2 Staff and pupils at the Veikko Vionoja school, Finland

Teacher Responsibility	No of pupils	Teacher
Preschool	5	Ms. Reetta Puskala
Primary Grade 1-2	21	Ms. Sari van Schaik
Primary Grade 3-4	18	Mr. Mauri Niemistö
Primary Grade 5-6	18	Ms. Maila Koivumäki
Teacher for special needs		Ms. Tuula Kellokoski
School assistants		Ms. Merja Haapaniemi
		Ms. Sonja Myllymäki
		Ms.Hilkka Teerikangas
		Ms. Riitta Heino
School meals		Hopijakumpu central kitchen
School Building		Ms. Irja Koskela
School nurse		Ms. Kirsi Korkeakangas
School transport		Mr. Panu Rahkola

Mrs Maila Koivumäki, the headteacher is responsible for all subjects in Grades 5-6 bar handicrafts, music and physical education. She graduated from the Chydenius Institute in 1989 but feels that she never received any 'proper education' in multigrade teaching. In her early years as a class teacher she felt challenged by the need to 'differentiate' her teaching to the needs of children but she has learned much

through experience. Much of her teaching style is directed 'from the front' but she supplements this with collaborative learning which offers pupils the opportunity to promote social growth and understanding in group settings. A strong believer in life long education she has educated herself after gaining the degree and is positive about the planned MUSE intervention.

Mr. Mauri Niemistö graduated as a teacher in 1976 and is responsible for all subjects in Grades 3-4 except music and Handicrafts in Grade 5-6

Mrs. Sari van Schaik graduated in 1999. She teaches every subject in Grades 1-2 bar physical education which is taught by the special needs teacher. She teaches handicrafts to grades 3-4 and 5-6. Her teaching style uses 'frontal' teaching, pair work and group/team working. She feels that the her greatest pedagogic challenge lies in organizing and differentiating learning in mathematics and mother tongue lessons.

Ms. Reetta Puskala graduated as a pre-school teacher in 2003. As well as teaching the five year old group and six year olds (8 and 5 pupils respectively) in a 19 hour per week programme she teaches music in Grades 3-4 and 5-6 and physical education in Grade 5-6). As they are so young all her pupils are transported to school. In her preschool classes she promoted learning through play, fun and activities of various kinds. Her greatest pedagogic challenge is in responding to individual differences in learning skills.

3.1.2.1.2 Physical resources and ICT

The physical resources of the school are very good. The school building is new and purpose-built with a library, with spaces for indoor sports and handicraft work. Classrooms are large and the space is flexible. School meals, provided free by the community, are eaten in a section of the hall.

The school is well equipped with personal computers, data projectors and facilities for video conferencing. Pupils are already familiar with using personal computers in their school work. Although video conferencing facilities are available the principal reports that these are, as yet, underused. The school has set ICT skill targets for all pupils by the end of the primary stage of education. These are:

- know how to assemble the computer
- can search information with computer
- can print
- can open different kinds a files
- know the basic concepts of ICT

3.1.2.2 Vintturi

The school is situated in the municipality of Kaustinen in the middle of Finland, also about 50 kilometres from Kokkola. The nearest small town of Kaustinen is 9 km away. All but one of the 27 pupils live in the villages of Vintturi or Tastula, or nearby. In 1995 the school celebrated its centenary and is highly valued by the people of Vinturri and Tastula. Being so small, and with high unit costs, plans for the school's future are raised from time to time. The option of transporting pupils to a larger school is resisted by parents.

3.1.2.2.1 Human resources

The staff and pupil numbers are presented in Figure 3. There are two regular teachers. One combines the preschool grade with primary grades 1 and 2; the other, the head teacher, combines four grades, 3-6. In addition to the regular teachers there is an 'administrative' principal who visits the school as needed and who also undertakes the administrative work of six other schools. There is also a special needs teacher, a part time school assistant, a person responsible for school meals and cleaning and another in charge of the building. Like Veikko Vinoja, provision for children with 'special needs' is intensive with the work of the special needs teacher supported by a school nurse, a psychologist and student counsellor, as well the headteacher and class teacher.

Figure 3 Staff and pupils at the Vintturi school, Finland

Responsibility	No pupils	Teacher
Grade 0-2	9	Mrs Leena Harju
Grade 3-6	18	Mr Pekka Lehto
Special needs		Mrs.Terttu Känsäkangas
School assistant (Mon-Wed)		Ms. Sari Kuorikoski
Administrative Principal		Mrs. Mailis Tastula
Meals/cleaning		Mrs. Mirja Koskela
School Building		Mr. Teuvo Isokangas

The two teachers directly involved in the project – Leena Harju and Pekka Lehto – gained their initial training in pre-school education. Leena is responsible for the preschool grade and primary Grades 1 and 2. She teaches all subjects. Her favourite subject if Finnish; her least favourite, handicraft. She feels that a multi grade classroom is challenging for the teacher and requires special organisational skills and a good knowledge of individual pupils. She believes that the benefits of a multigrade pedagogy include the promotion of socialisation through interaction of the pupil with different age groups; the opportunity of teaching individual skills according to pupils' development stage and individual skills; the possibility of grouping children according to a number of criteria and not only age. The greatest challenge was posed, she felt by the need for a greater range of differentiation than in a single grade classroom. She felt constrained by the physical space available for pupils and felt that this contributed to their disturbing others.

Pekka Lehto also trained initially as a nursery teacher. He has yet to complete the dissertation for his Masters thesis but has completed all his teacher education courses. In Finland completion of the Masters degree is a necessary for the qualification of primary school teacher. He teaches all subjects, his favourite subjects being biology and music, his least favourite religious studies. He perceived the benefits of the multi-grade classroom to lie in its potential to promote social and nurturing skills, learning from others, learning form and with peers and independent learning. Cooperation with parents is also easier in a small village school. He perceived the major challenge to lie in the fact that he is always trying to teach two subjects at the same time.

3.1.2.2.2 Physical resources and ICT

The old school building is a wood construction with two classrooms, three auxiliary rooms and an equipped classroom for technical and woodwork. A school during the

day, it is used for a range of community activities in the evenings. The buildings are in need of repainting. The condition of school equipment is variable. The Plumbing, electricity and wc, cassette player and maps was judged to be in good condition; desks, chairs, television, video machine, slide projector, student library and educational software in mediocre condition; and the photocopier, teacher's library and instruments for experiments (physics and chemistry) in poor condition.

Located near the woods, the school offers opportunities for environmental studies. A large schoolyard and an area for skating and ice hockey offer plenty of opportunities for play and recreation.

The school is equipped with six computers, a data projector, video-conferencing equipment, printer, scanner, web-camera, speakers and microphone. Pupils are already using computers actively and frequently. They use them for writing documents, using educational software and playing games. There is Internet connection and the school is connected to a local network. As in Viekko Vionoja, the video-conference system is used little and the teachers feel that it should be used more often. The teachers use the computers well but feel the need to constantly update their skills and expressed the need for more technical support. This school is already involved in another ICT project (VERKOKE) whose aim is the development of e-learning in the local area. The Vinturri promotes the same ICT skill targets for all its pupils by the end of the primary stage.

3.2 Greece

3.2.1 System

3.2.1.1. Extent of multigrade teaching

In Greece 47% of the primary schools are multigrade and 17% of the teachers are working in multigrade schools. There are several hundred small islands across the Aegean Sea. These islands are geographically isolated, are situated mostly in the south-east of the Aegean sea, far from the mainland. The population density in these islands is low and there are serious inter-island communication problems. Most of the primary schools are multigrade and play a vital role in these small communities. Multigrade schools are also found in the remote mountainous areas of mainland Greece. Multigrade teachers are often young, inexperienced and at the beginning of their teaching careers. The teaching conditions they face are professionally challenging.

3.2.1.2 National Curriculum

Salakos school follows the Greek National Curriculum, in line with guidance from the Ministry of Education on how this should be done in multigrade schools. Each teacher continually assesses and reports on student achievement across the curriculum but there are no formal examinations at any stage.

The Greek national curriculum for primary schools was developed in 1955 and has been neither developed nor revised for the multigrade classroom. It is a 'graded' curriculum and is premised on the single grade classroom. Student texts and workbooks are developed for each grade on the presumption that each higher grade offers more complex demands on pupils' learning. Pupils are provided with these graded texts. Assessment of student achievement is undertaken continuously by the teacher. There are no formal examinations at the primary stage.

Figure 4 indicates the official weekly study hours for different subjects, and grades. Note that letters A-F are used to represent Grades 1-6 respectively.

Figure 4 Official weekly study hours for Greek primary schools, by subject and grade

SUBJECTS	**CLASSES**					
	A	**B**	**C**	**D**	**E**	**F**
Religion	-	-	2	2	2	2
Language	9	9	9	9	8	8
Mathematics	5	5	4	4	4	4
History	-	-	2	2	2	2
Environment Study	4	4	3	3	-	-
Geography	-	-	-	-	1	1
Physics	-	-	-	-	3	3
Social & Political Education	-	-	-	-	1	1
Aesthetics	4	4	4	4	2	2
School Life	1	1	-	-	-	-
English	-	-	-	3	3	3
Physical Education	2	2	2	2	2	2
Total Number of Hours	**25**	**25**	**26**	**29**	**28**	**28**
Flexible zone	4	4	3	3	2	2

Grade Combinations

Unlike in Finland and Spain, the Greek Ministry of Education provides guidance for the principals of multigrade schools on how the grades should be combined and teaching inputs timetabled.

In a 3-teacher school, two adjacent grades should be combined i.e. A and B (1+2), C and D (3+4) and E and F (5+6). In the case of the first two grades (A+B) pupils share classroom space but each grade should be taught separately by the teacher. The principle behind the separation is the need to have graded inputs from the teacher in the initial, foundational stage of primary education.

In a 2-teacher school the recommended grade groups are (A, C, D) and (B, E, F). Grades A and B are not only taught separately by the teacher, but in this configuration they also sit in different classrooms. But the principle of teaching grade A and B as in single rather than multigrade groups is maintained. In the classroom with grades A, C, D the teacher teaches grade A as on and Grades (C+D) as a combined group. In the classroom with Grades B, E, F the teacher teaches grade B as one and Grades (E+F) as another. When the teacher works with one group (whether a single or combined grade) the other group engages in ‘silent’ work.

Subjects and Grades

The Ministry recommends that for (C+D) and (E+F) the Ministry pupils should follow the same subject at the same time and be treated as if they were a single grade. In one year all pupils in (C+D) should follow the subject curriculum for Grade C; in the following year the curriculum for Grade D. Dependent on the year of entry to Grade C

a pupil may work through the curriculum in reverse order i.e. grade D followed by C. This adaptation of curriculum is known as a '2-year curriculum cycle' (though in other countries a 2 year cycle may also include differentiated learning activities for pupils of the two different grades).

The single exception to the 2 year curriculum cycle principle is the subject of Maths. The Maths curriculum is strictly 'graded' and it is assumed that pupils will work through it in the sequence A-F. Its design does not permit reverse ordering of adjacent grades. All grades are treated separately, with one grade group receiving direct tuition from the teacher while the other grade(s) engage in 'silent', individual work, or study/activity outside the classroom.

Subject Teaching Hours

Figure 5 presents the recommended number of teaching hours in a 2-teacher school, by subject and grade combination (A,C,D and B,E,F). Figure 2 indicates that most of the teaching input focuses on the Greek language, followed by Mathematics. Note that teaching inputs for Mathematics are half-hour slots. Grades A and B receive separate teaching inputs, while C+D and E+F are combined and taught as one.

Figure 5 Recommended Weekly Teaching Hours in a 2-teacher Multigrade School

c/n	Lessons	1st Teaching Division						2nd Teaching Division					
		General Teaching A,C,D	A	Groups C&D			Hours In Total	General Teaching B,E,F	B	Groups E&F			Hours In Total
				C	D	C&D				E	F	E&F	
1.	Religion	-	-	-	-	2/2	1	-	-	-	-	2/2	1
2.	Language	-	8	-	-	8	16	-	8	-	-	8	16
3.	Maths	-	4/2	4/2	4/2	-	6	-	4/2	3/2	3/2	-	5
4.	History	-	-	-	-	2/2	1	-	-	--	--	2/2	1
5.	Environmental St.	-	4/2	-	-	4/2	4	-	4/2	-	-	-	2
6.	Geography	-	-	-	-	-	-	-	-	-	-	2/2	1
7.	Physics	-	-	-	-	-	-	-	-	-	-	3/2	1½
8.	Social St.	-	-	-	-	-	-	-	-	-	-	½	½
9.	Aesthetics	-	½	-	-	½	1	-	½	-	-	½	1
10	Physical St.	2/2	-	-	-	-	1	2/2	-	-	-	-	1
		1	12½	2	2	12½	30	1	12½	1½	1½	13½	30

Weekly Teaching Timetable

Figure 6, by contrast, presents the Ministry-recommended weekly teaching timetable by day, period, subject and grade, for a 2 teacher school. Significantly it is *teacher timetable,* not a *pupil timetable*. Hence it indicates only the subjects and grades on which the teacher should be focussing at any one time. It does not indicate the

subjects on which the pupils in the other grades should be following 'silently' at any given time. This is developed at the school level. In the case of the MUSE school – Salakos – the subject activity of the silent groups is detailed on the weekly timetable. Figure 6 presents the timetable for grades A, C and D only.

Figure 6 Teacher and Pupil Timetable, Salakos 2-teacher school, by day, period, grade and subject (Grades A, C and D only)

Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:30 - 09:15	Language A' Environ. C' D'	Language C' D' Language Preparation A'	Language A' C' D' free project work	Language C' D' Language Reading A'	Language A' C' D' free project work
09:15 - 10:00	Language A' Language Preparation C' D'	Language C' D' A' Painting	Language A' Language Preparation C' D'	Language C' D' A' Painting	Language A' C' D' free project work
30'	BREAK				
10:30 - 11:15	Language C' D' Language Reading A'	Language A' Language Reading C' D'	Language C' D' Language Reading A'	Language A' Language Reading C' D'	Language C' D' Language Reading A'
11:15 -11:35	Maths A' Language Reading C' D'	Maths D' Language Reading A'	Language C' D' A' free project work	Maths C' Language Reading A' D' Painting	Maths A' History preparation C' D'
11:35 - 12:00	Maths C' Problem solving A' D' observe	Maths A' Environ. Preparation C' Problem solving D'		Maths A' Problem solving C'	Maths D' Problem solving A'
20'	BREAK				
12:20 - 12:40	Maths D' Problem solving C' A' Painting	Maths C' Language Reading A'	Environ. A' Language Reading C' D'	Maths D' Problem solving A' C' Painting	Environ. C' D' A' free project work
12:40 – 13:00	Environ. A' History preparation C' D'	Environ. A' Problem solving C' D' Painting	Maths C' Environ. Project A' D' Painting	Environ. A' Religion preparation C' D'	History C' D'
13:00 – 13:20	History C' D'	Environ. C' D' Problem solving A'	Environ. C' D' A' free project work	Environ. C' D'	A' C' D' Physical Education
13:20 – 13:40		Religion C' D'	A' C' D' Physical Education	Religion C' D'	

3.2.1.3 Teacher training for multigrade teaching

Currently teachers receive no regular training in multigrade teaching.

3.2.2 The MUSE school and teachers

3.2.2.1 Salakos

Salakos is a small village in the municipality of Kamiros of 350 persons on the West side of Rhodes island, mainly employed in farming, livestock rearing and tourism. It is 40 km from the capital Rhodes town and 7km from the North West coast. The village belongs to the Municipality of Kamiros. A few restaurants cater to passing foreign tourist trade. In the summer months many villagers work in tourist hotels elsewhere on the island. Salakos primary school is the only school in the village. Post-primary pupils travel 15 km to Sorini to the nearest gymnaseum (grades 6-9) and lyceum (grades 10-12). No school fees are levied by the schools and the government supplies all the necessary textbooks. Post primary pupils travel free by bus

3.2.2.1.1 Human Resources

The principal of Salakos school is Mr Dimitris Zorzos. He and his family live in the village, of which his wife is a native. Mr. Zorzos is the sole teacher who participated in the MUSE training programme as there was constant movement of other teachers. The movement of other teachers in and out of the school during the 2 year period of the MUSE project is symptomatic of the pattern elsewhere in Greece. In June 2003 there were 3 teachers (including the principal) and the pupils were grouped in the combinations A+B, C+D, E+F. By September 2003 two of the teachers had moved and were replaced by a new teacher with no experience of teaching in a multigrade school, bar one week of practice and one week of observation in a multigrade school during training. By September 2004 this teacher too had left the school and had been replaced. The constant human resource in the school is the principal, with one year of service as a teacher and 16 years as principal (as at 2004). The regular turnover places a training obligation on the principal who must offer on-the-job training to young staff, with often little or no previous experience of multigrade teaching.

Attached to the Salakos primary school is the pre-school. Officially the kindergarten is a separate school, its single teacher its principal. Housed in the same building as the primary school and sharing an office with it, the two ‘schools’ interact on a daily basis. The principal of the primary school offers considerable informal support to the kindergarten.

In addition to class teachers with responsibilities for teaching several subjects the school is ‘entitled’ to specialist teachers for Music, English, Drama and Art. Such teachers had never been deployed to Salakos school, though there was an ongoing dialogue between the school and authorities about the sharing of an English teacher with a neighbouring school. Some parents pay for their children to have private English lessons in other towns two or three afternoons per week

In June 2003 Salakos school had 41 pupils and 6 grades, of whom 20 were boys and 21 girls.

3.2.2.1.1. Physical Resources

The school is very well endowed with material resources, computers, video, TV, data projector, scanner, telephone. The classrooms are spacious and the space is flexible

(two can be joined to make a large hall). Over the years the principal (with support from others) has constructed a stage for drama and concert performances, with curtains and ten backdrops! The school has a large playground and separate area with swings etc.

The principal of Salakos school has a keen interest in the use of ICT to support his own teaching and also in developing his pupils skills in the use of ICT. He has built up a commendable stock of hardware in the classrooms and also a large collection of CD and video materials

3.3. Spain

3.3.1 System

3.3.1.1 Extent of multigrade teaching

It is reported that in Spain multigrade schools are uncommon 'and the fact that these cases are exceptional means that needs arise that teachers have to face ' extra-officially'. (Gomez, 2003: 73). They are found mainly in rural areas. In recent years more flexible forms of grouping students for learning have been mandated by law for all students. Teaching is personalised and adapted to the learning pace of each student'. At the same time no specific model for how to realise this aim has been proposed; nor has there been any proposal to abandon traditional ways of grouping students for instruction. Almost twenty years ago a Royal decree acknowledged the challenges faced by rural schools and proposed the grouping together of small rural schools in order to improve educational efficiency and delivery. Despite this there are no guidelines on how multigrade teaching should be organised, subjects taught etc. Schools have considerable autonomy in these matters within the general framework of a National curriculum

3.3.1.2.National Curriculum

Unlike in Finland and Greece the MUSE involvement in Spain was at the stage of Compulsory Secondary Education (ESO). This is a new compulsory and free stage of education for students aged 12-16 and has replaced the last two years of the former Basic General Education span (Grades 7 and 8) and the first two grades of the former 'Middle school'. It is divided into two cycles, grades 7-8 and grades 9-10. The teacher and students involved in the MUSE project were in Grades 7 and 8, the first cycle. Students in the Grade 7 of the Spanish system are equivalent in age to those in Grades 6 of the Finnish and Greek systems (i.e. 12-13 years). In terms of the system they are in secondary stage of education; their age peers in Finland and Greece are in the primary stage.

The curriculum at secondary stage is divided into two cycles of two academic years. The content is organised by cycle, academic years, common and optional content. The common subjects in the first cycle, where our MUSE teacher and class are located, are listed in Figure 7.

Figure 7 National curriculum for Grades 7-8, Spain

Common	Elective (one from the list)
Spanish Language and Literature Autonomous Community Language and Literature Foreign Language Mathematics Social Sciences, Geography and History Physical Education Natural Sciences Plastic and Visual Education Technology Music Religion/ Complementary Activities	Second Foreign Language Communication Processes Mathematics Workshop Craftsmanship Workshop

3.3.1.3. Teacher training

Multigrade teachers in Spain receive no training for teaching in multigrade schools.

3.3.2 The MUSE 'school' and Teacher

3.3.2.1 C.P.R. Campiña de Tarifa and the Bolonia centre

The MUSE project is sited in one of three centres of the C.P.R. Campiña de Tarifa. This is an example of a grouped school, created from rural centres in line with an Order passed by the Ministry of Education and Science of the Andalusian Regional Government in 1988. The school was created at the request of the educational communities in the three centres after having met all the prerequisites, including the school plan.

The three centres that make up the grouped school are located in the Tarifa municipal area, in the Campo de Gibraltar, in the villages of Bolonia, Tahivilla and La Zarzuela-El Almarchal.

The population served by C.P.R. Campina de Tarifa consists of 400 inhabitants in Bolonia, about 500 in Tahivilla and 150 split between La Zarzuela and El Almarchal. The population of Bolonia is spread out between the rural estates in the Plata and San Bartolo mountain ranges. It also has three small pockets of population separated from each other on the coast. La Zarzuela and El Almarchal are two populated areas

one kilometre apart, to which must be added the surrounding rural estates, mainly on the east face of the Plata mountain range. The population of Tahivilla is in a built-up area next to the main road from Cádiz to Algeciras, in the direction of Málaga. The villages forming the C.P.R. Tarifa group are spread out. From Bolonia to Tahivilla is 19 km; from Tahivilla to La Zarzuela 11 km; from La Zarzuela to El Almarchal 1 km; and from Bolonia to La Zarzuela 30 km

Economic activity in Bolonia is based on three production sectors: fishing and snail gathering, cattle farming and the hotel industry. In the last few years, the beautiful beach and the Roman remains of Baelo Claudia, as well as the natural beauty of the place, have been attracting a high volume of tourism and this is allowing new families to settle. Pockets of unemployment also exist here which decline in the summer. Tahivilla is mainly agricultural, with good, well laid out, and providing the population with a good income. It is a village of "colonised" land so almost half of the families in the village own their own fields. In recent years unemployment has become apparent. The main economic activity in La Zarzuela is cattle farming, although there are some areas of dry farming. Insufficient to maintain the whole population, unemployment levels are high. These decline in the summer, when the hotel industry of Zahara de los Atunes absorbs part of the unemployed labour force.

In general the population is young. Households are described as 'of stable couples and traditional thinking' (Rachels report). The number of children per family has declined in recent years: 60% have two children, 30% have three and 10% have between four and ten. But the growing importance of tourism is bringing new families to the area. The houses in Bolonia and la Zarzuela are detached and spread out, whilst in Tahivilla they are in a villageThe number of inhabitants per house ranges between 3 and 5, but in some cases the figure is between 5 and 10. The facilities in the houses vary depending on their location; in Tahivilla the facilities are acceptable but in 50% of the rural estates in Bolonia there is still no electricity and the approach roads are lanes. Seventy per cent of the population belongs to some association, either a neighbourhood association or parents' association, although half say that they do not participate in the working or the activities of these associations. The educational level is very low, with a high level of illiteracy. They have low expectations for their children, although this attitude is gradually changing.

Human Resources

C.P.R. Campiña de Tarifa has 200 students in total. In 2003 100 attended the Bolonia centre, 87 the Tahivalla centre and 13 the centre in La Zarzuela. Although the attitude of children towards school is generally very positive, the attitude of some parents towards the school is not always positive, leading to absenteeism, 'pockets of academic failure' and age-course disparity, as well as some anti-social behaviour (Ramirez, 2003). The student composition in Bolonia centre differs from the other two in its cultural and linguistic plurality. Inward migration from other parts of Europe means that in 2004, some 33% of students are nationals of other EU countries. Although some have a Spanish parent, most join the school with little knowledge of Spanish. While this enriches the social environment of schooling it poses major challenges for teaching.

The term 'unit' is used to describe a multigrade group or class of students. The legal composition of the C.P.R. Campiña de Tarifa, in terms of the number of units, and their respective grade combinations is set out in Figure 8.

Figure 8 C.P.R. Campiña de Tarifa units, by centre and grade (year) combinations

Bolonia: Infant: 4 and 5 years old
Primary:
First Cycle: 1st and 2nd years
Second Cycle: 1st and 2nd years
Third Cycle: 1st and 2nd years
First Cycle of Secondary: 1st and 2nd years.

Tahivilla: Infant: 4 and 5 years old
Primary:
First Cycle: 1st and 2nd years
Second Cycle: 1st and 2nd years
Third Cycle: 1st and 2nd years
First Cycle of Secondary: 1st and 2nd years.

La Zarzuela: Infant: 3, 4 and 5 years old.C.P.R.

Teachers:

In Bolonia unit there is one full time teacher for the primary school and one full time teacher for each of the three primary school classes. Three full-time secondary teachers are also based at Bolonia and teach the secondary class in this unit as well as the secondary class at Tahivilla because they are subject specialists. Bolonia also has 2 assistant teachers and 3 peripatetic teachers. The peripatetic teachers move between the three units comprising the school.

Tahivilla school also has a full time teacher for each of the pre-school and primary classes and has some secondary teachers that also teach at Bolonia school. La Zarzuela has a full-time teacher for the one infant class.

The teacher who participated in the MUSE project is Mr Manuel Quilez Serrano with responsibility for the Grades 7 and 8 in the Bolonia centre.

3.3.2.1.2 Physical Resources

Bolonia school was originally designed to be a family house. It is a collection of small buildings two of which are connected and house al the classes except for the nursery class which is in a separate just to the left of the main building. The secondary classroom is an unusual shape in that it is hexagonal but all classes are well lit and resourced in terms of moveable furniture, blackboards and ICT equipment. There is a small grassed area around the school and a separate fenced off play area close to the school. Within the school compound and behind the classrooms there is a small area used for a chicken breeding project.

PCs and other peripherals (external recorder, printer, digital camera, scanner, card reader etc) are handled with ease by the students. The major challenge posed for the teacher at the beginning of the MUSE project was the absence of a broad band connection for the internet. The conventional connection is slow, erratic and expensive.

4.0 Training needs and training content

In this section we move to the analysis of training needs in each country to the development of the training programme with common content. The analysis of training needs (WP2) was seen in the original proposal as a necessary and preliminary step in the development of the training programme (WP3). The analysis of training needs was undertaken in a variety of ways by the various partners.

4.1 Training needs in Finland

In Finland 12 teachers from 8 multigrade schools in rural areas in Northern Finland were interviewed by members of the Chydenius Institute. Each school had 2-3 teachers and between 30 and 70 pupils. The level of ICT infrastructure in each school was already high and teachers and pupils were already familiar with using PCs in their work. The challenges of multigrade teaching expressed by these teachers were several. They felt that their work was professionally very demanding and they often felt isolated from other teachers. With the introduction of a new curriculum nationwide these multigrade teachers wanted support to understand it and introduce into their multigraded schools. Teachers felt that one of the greatest pedagogic challenges in the multigraded classroom was the differentiation and individualisation of teaching. While computers were already in use in the classroom teachers wanted to learn more about how they might be used to better support teaching and learning in multigraded classes (Paasimaki, 2003, Annex 1).

Teachers identified the following areas as being important content in the training programme.

- Cooperation between the pre-school and the first grade of primary schools to identify individual needs of children and ensure a sound start to primary education
- Social development of the child and the opportunities for teacher intervention
- Didactical aspects of multigrade education, materials, new ideas and teaching 'tips'
- Sociological and psychological perspectives on the future of multigrade schools
- The new curriculum: how to do it and deal with it, especially in multigrade classes
- The value of multigrade schools
- The need for a practical and continuing education in this area

(adapted from Paasimiki, 2003, Annex 1)

4.2 Training needs in Greece

The Analysis of Teachers' Needs in Greece was conducted through interviews with multigrade schoolteachers participating in the project SXEDIA and through a MUSE questionnaire survey of 900 multi grade schools. The questionnaire survey revealed that 100 of the 900 schools had been closed. The study also revealed that schoolteachers felt that the curriculum they had to teach is neither differentiated nor adjusted in the needs of multigrade schools. As a result, they face problems with the

volume of work and with the distribution of teaching time. They have insufficient time to complete the teaching of the main subjects. This has a negative backwash on the less important subjects to which they devote less time or they don't teach at all. The main teaching methods employed are collaborative learning and silent assignments. They feel that they need good examples of implementing this method, in real and not ideal conditions. To a large extent, in order to carry out the needs for silent assignments, it is necessary to prepare worksheets at home. They consider that this work puts extra pressure in their already full timetable.

Teachers were asked their opinion about priority content for a training course for multigrade teachers. The priority areas and frequency of response were:

- Teaching materials and their use (65%).
- Methods for reorganizing the curriculum, so that it is suitable for the needs of multigrade schools (63%).
- Information technology and its applications (56%).
- Teaching methodology, and dealing with administrative work(50%), and
- Classroom arrangement in multigrade schools (48.5

A full version of the extensive analysis is available in the report submitted to the MUSE project by the University of the Aegean.

4.3 Training needs in Spain

The report from the MUSE Spanish team referred to a number of challenges faced by students and teachers. Although these do not point to specific content areas they highlight concerns that could be addressed within a training programme. They include:

- *Physical and cultural isolation of students and teachers: The need for Homogeneity between centres.*
- The need for a more positive evaluation of work of teachers by local communities *activities as possible.*
- Unification of Methodological Criteria in classes
- Introduction of *cross-curricular or transverse subjects including academic content values, personal development etc.*
- Lack of resources
- Grouping of children of various levels
- Physically and psychologically demanding work for the teacher
- Poor physical structure of buildings and deficiencies in equipment

- Temporary nature of the staff, due to high level of mobility that makes continuity in the work with students and the development of a Curricular Plan impossible

- Teachers are not prepared for rural schools: University teacher training courses do not deal with multi-level schools

- Difficulty in completing the official curriculum and the need for flexible approach to educational inspection

- The need for continuous professional development and in particular for new teachers.

- Difficulty in team work in grouped rural schools

- Little diffusion of innovative practice and methodological advances

- Information and communication technology is limited and of poor quality

The full report is available on the MUSE website.

In addition to the work in Finland and Greece additional reports were submitted from needs analyses undertaken with teachers in England and Scotland. These served to increase the range of European contexts from which training needs were identified. The search for appropriate content areas was supplemented substantially by internet searches and the use of two existing web-based data bases on multigrade teaching (www.ioe.ac.uk/multigrade and www.nwrel.org/ruraled/multigrade.html)

4.4 From training needs to the design of the training programme

The analysis of training needs occurred in the first few months of the project, at a time when the project was in its infancy, the team's composition fluid and a collective consensus of the purpose and organisation of the project, still embryonic.

During the Rhodes workshop (June 2003) we evaluated progress to date and made the following observations and modifications.

No meta-analysis of the various training needs analyses had been completed in time for this workshop. In the meantime work on WP3 had started and a first draft presented At the workshop, based mainly on web-based information. Given the over-riding commitment of the MUSE project to a teacher-centred approach this process appeared contradictory. Moreover, it became clear that in Finland the partner schools and teachers had changed since project inception. The new teachers had not participated in the identification of training needs. Nor had the views of the partners teachers in Greece and Spain been sought systematically. This called for a modified approach and a closer connection between the teachers who would participate in the training programme and the structure and content of the programme. It was decided that partner teachers would be invited to comment immediately on the draft structure and content of the training packages. A workplan was developed for this (Evaluation Plan V3) and subsequently implemented.

The discussions surrounding the connection between WP2 and WP3 were intense and possibly reflected differences between the partners in the meaning and practice

of user-centred and teacher-centred approaches. For some this meant involving the end user (the teacher) in every step of programme development, including the needs analysis; for others it meant involving similar end–users (other teachers) in the needs analysis but not necessarily those who would trial the material as 'trainees'. From the nature of the discussion it was impossible to judge the extent to which differences in perspective reflected differences in cultures, pedagogic styles and/or gender.

By September 2003 teachers in all partner schools had commented on the draft structure and content of training. So too had the two members of EID and members of each of the partner teacher education institutions. All comments had been processed by MO (EA) and substantial changes made to the training materials. A comparative analysis of the material submitted to the June meeting had also been undertaken (see the Comparative Analysis on the website) and this had contributed to the structure and content of the training programme. Between June and September of 2003 the training materials has been substantially modified.

5.0 Observing multigrade practice

During the course of the project a number of multigrade classes were observed by different partners. Teachers observed teachers; teacher educators observed teachers; evaluators observed teachers. Seventeen of these lessons were observed and recorded systematically. The majority were recorded on digital video camera. Since the observations were made at different points in the project cycle in different countries they cannot be used to assess the impact of the programme. Instead, they are used in this evaluation report in 3 ways:

- The analysis of forms of organisation that teachers employ to manage the learning of different subjects of children learning in multigrade settings is used to demonstrate the diversity of forms between and within countries and schools

- The analysis of the actions of teachers throughout lessons illustrate how teachers manage time to ensure that children of all grades are 'on task', even when the teacher is working directly with children in another grade

- Selections of the observations are reconstructed into a *** minute DVD with commentary to facilitate communication between partners about the practices of multigrade teaching. The DVD, with its written commentary, is a tool that can be used flexibly for teacher training and other purposes in the future. This was not an originally planned outcome of the project – but emerged as the project work developed.

5.1 Class observations

The observations of the 17 classes are listed and presented below. The reader may like to read all before moving to the analysis, or read one or two from each country before moving to the analyses and returning to the remainder as they read through the analysis.

The multigrade classes observed and recorded systematically were as follows:

1. Finland Veikko Vionoja, 3+4, Biology 27.10.2003 (JP)
2. Finland Veikko Vionoja, 5+6, Finnish Language 27.10.2003 (JP)
3. Finland Veikko Vionoja, 3+4, Language 13.5.04 (PP)
4. Finland Veikko Vionoja, 1+2, Maths 13.5.04 (PP)
5. Finland Veikko Vionoja, preschool 13.5.04 (PP)
6. Finland Veikko Vionoja, 5+6, environmental studies?? 13.5.04 (PP)

7. Finland Vinturri, 0+1+2, Maths 3.11.2003 (JP)
8. Finland Vinturri, 3+4+5+6, Language and Maths 3.11.2003 (JP)
9. Finland Vinturri, 0+1+2, Maths 12.5.2004 (PP)
10. Finland Vinturri, 3+4+5+6, Biology 12.5.2004 (PP)

11. Greece Salakos, 1+3+4, Language 17.9.03 (AL/PP)
12. Greece Salakos, 2+5+6, Language 17.9.03 (AL/PP)
13. Greece Salakos, 2+5+6, History and Language 17.9.03 (AL/PP)
14. Greece Salakos, 2+5+6, Maths and 'free choice' 17.9.03 (AL/PP)
15. Greece Salakos, 3+4, Language 13.6.03 (AL/AK)

16. Spain, Bolonia, 7+8, Environmental studies Feb 03 (PP)
17. Spain, Bolonia, 7+8, Maths Feb 03 (PP)

Observation 1 Veikko Vionoja, 3+4 Biology

Grade 3 has 7 pupils, grade 4 has 11 pupils

This class has a regular school assistant who helps the teacher in almost every lesson. The teacher reports that the assistant helps a lot. It is easier to differentiate lessons and enables pupils to receive help on an individual basis. The class has one handicapped pupil who requires much assistance.

In this class pupils follow mother tongue (Finnish), Mathematics and English in grade order. Religion and Environment study, by contrast are taught in a two year cycle. This year Grades 3 and 4 are following the national curriculum for Grade 4 in these two subjects. The atmosphere in the lesson is calm and good.

12.15 T starts the lesson about Biology. He shows pictures about nature etc. He starts to tell facts about the pictures.
12.25 T asks one pupil to give material for everyone. Class is doing diary about nature. T asks who knows fine model for birdhouse. Nobody reacts. T´s lecture goes on.
12.35 T shows pictures about different kind mushrooms. T asks what kind of a mushrooms they already know. T tells more about poison mushrooms and shows picture about mushrooms that children are not allowed to eat.
12.38 T draws a picture about different part of mushroom. Class assistant is working all the time with the plants.
12.40 T tells the pupils to start to read from their books. Pupils begin to read more facts about mushrooms. Two girls start to make laminations work with the assistant. They are laminating plants. T asks one pupil to read in loud from her book. T gives reading turns and explains difficult part of the text. Lamination work goes on.(everyone has to do it)
12.45 T tells pupils to start to work with their workbooks.
12.52 T goes through work pupils have just done. The workbook sheets. Pupils answers, not much hands up.
12.55 Assistant helps all the time with the lamination work.
12.57 T gives homework. Pupils have to read their reading homework three times. In addition they get homework from the workbook.
13.00 The end of the lesson

Observation 2 Veikko Vionoja, 5+6, Finnish language

Grades 5-6 have 18 pupils in total.

In this class Mathematics and English are taught in grade order. All other subjects are studied together at more or less the same level by the two grades**.** The decision about whether to combine or separate the content/level for subject is taken by the teacher.

Observation 3 Veikko Vionoja, 3+4 (10-11 years), Finnish Language

Grade 3 10 (9 girls, 1 boy); Grade 4 (4 girls and 4 boys). Duration 1 hour

The teacher provided a lesson plan at the start of the lesson and was assisted throughout by a teaching assistant. The lesson was directed by the teacher and the assistant helped to hand out papers and support individual pupils and groups to move forward with the task. This was the first lesson of the day and it started (as always) with a whole class introduction. This morning the teacher read a short passage from the bible and played some quiet music. The teacher then conducted a brief whole-class language test asking questions and recording the oral answers on the overhead projector. He then introduced the lesson explaining that pupils were

12.30 T starts the Finnish Language lesson. Everybody is doing the same things at this lesson. T explains and pupils answers T´s questions.
12.45 T gives copy/A4 to pupils. It is a worksheet about the matters she had just taught to them. T explains how to do the worksheet. T tells to four pupils to start to work with the computers. Pupils works with the programme which is helping them to understand Finnish language and words. Pupils work independently with the things they learned in beginning of the lesson. All the time pupils who work with the computers have difficulties. One girl has trouble with the technical matters.
12.53 Other pupils do their worksheets and starts to talk with each other a little bit.
12.55 T helps pupils all the time while school's assistant came in to the classroom to tell something about schools management and is T available for something
13.00 Pupils have done the work T gave them. Pupils were very active all the time. T tells to pupils that they can have a break. Pupils can also stay in the classroom if they like and everyone stays.
13.05 Boys goes for the break first and the lesson ends

going to be journalists and write articles for a newspaper. The task was differentiated with grade 3 working in self-selected small groups to make a poster and grade 4 working in small groups to write articles for a class newspaper. In all groups boys chose to work with boys and girls with girls.

The poster paper was fixed onto the blackboard and divided into sections for news, weather, sports etc. Pupils worked in twos and threes to find or write content for the poster and then stick their contribution on the poster. Grade 4 worked in a similar

way but there was more writing of original material and less cutting and pasting of content they had found. Pupils had access to the Internet to find weather information and maps and also to the television text pages to get the latest sports news etc. Additional space was made available to them to cut and paste in the library.

After one hour the lesson stopped for pupils to have a short lunch break and then continued for a second hour (which was not observed). At the end of this second lesson the class came together and shared the poster made by grade 3 and the class newspaper made by grade 4. The poster was displayed on the classroom wall and the newspaper put into the library for other pupils staff and parents to read.

Observation 4 Veikko Vionoja, 1+2, Maths

Grades 1+2 (8-9 years old – n.b. pupils enter Grade 1 aged 7; the observations by PP at Veikko Vionoja were conducted at the end of the school academic year). Duration 1 hour.

There were about 20 pupils in the class and a full-time teaching assistant working with the teacher and pupils. Although the subject was the same, pupils were divided into their grade groups ands treated separately. The teacher spent most of her time with Grade 1, while students in Grade 2 were given a revision activity using computers. Grade 2 pupils were dispersed around the classroom and also some other classrooms so that each pupil had a computer with a maths revision programme. The programme was interactive in that it asked them to give answers and then 'spoke' to them saying whether their answer was right or wrong. The teaching assistant spent most of her time supporting the work of grade 2 pupils on the computers.

Having given grade 2 pupils their instruction to do the revision task and set up the computers for them the teacher left the teaching assistant to settle the children down and turned her attention to grade 1 pupils. One pupil had special learning needs. She followed her own individual curriculum – working on a task from the textbook. The teacher then gave direct input to the rest of this group – presenting maths tasks on the OHP using transparent 'unifix' cubes'. Pupils took turn to come up and write down the answer to a task and the whole process was displayed for the class to follow on the OHP.

Observation 5 Veikko Vionoja, Preschool Grade (5-6 years) , mixed activity

This lesson was only observed for 15 minutes because the class was scheduled to go off to a swimming lesson. The small group of about 10 children had a spacious classroom with moveable furniture and also an adjoining room very well resourced with separate play areas – a shop, dressing up area, soft toys etc. In the lesson observed the teacher started by inviting one child to come up to the blackboard and display the date and the day. Children were seated in two groups around large tables. The teacher then played the guitar whilst the children sang a song and did their daily physical exercises for 5 minutes.

Observation 6 Veikko Vionoja, Grades 5+6 (12-13 years old), Environmental studies

Duration 1 hour

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There were about 20 children in this class and a full-time teaching assistant. For environmental studies the teacher uses a two-year curriculum span. To work through the entire process takes the teacher 4 hours. I observed the first 2-hours which covered steps 1 to 4 in the 7-step enquiry process shown below:

1. What is the problem/issue to be explored? (Teacher builds the context using books, stories, ICT)
2. What questions do I want to answer in my enquiry? (Pupils write questions)
3. What do I know already? What more do I need to find out? (Pupils develop a mind map)
4. Finding out more (Pupils gather new data using ICT, books etc.)
5. What did I find out? How do I now see the problem? (Pupils critically reflect on their findings)
6. What new questions do I want to answer? (Pupils write new questions)
7. What do I understand now? What is my new theory? (Pupils develop a new mind-map.

The teacher began by explaining that they were going to start a new enquiry into how to classify insects. She wrote the first step on the blackboard 'What is the problem/issue to be explored?' and gave a general introduction using large pictures and charts of insects and digitised material projected onto the classroom wall through a data projector to illustrate the problem/issue. She then moved onto the second step (again writing the question on the board to track the process) and divided the class into groups to work on this enquiry. Each group was set the task of writing a 'learning diary' on 'How to Classify Insects'. One pupil in each group decorated the front cover of the diary whilst the rest of the group began to write questions that they wanted to answer in their enquiry. The next step was to discuss what they already knew about how to classify insects and then to develop a mind-map (web-diagram) using this information and to add to this diagram things they wanted to find out. One person in each group acted as a scribe to draw the diagram and to keep adding to it as the group moved through the enquiry process. At the end of each step in the process the teacher brought the pupils together to move them onto the next step together.

In the next step the group set about collecting information to answer their questions. To help them do this the teacher provided a range of resource materials. There were 5 computers in the classroom, they had internet connections and pupils were encouraged to use the 'google' search engine. They also had resources on CD and reference books. One computer was attached to the data projector so that pupils could share information on the large screen. Pupils appeared to be learning in a truly collaborative way although it was evident in one group that one pupil was doing very little. This observation led to a later discussion with the teacher about continuous assessment when she confirmed that she made notes not only about the final quality of the learning diary produced by each group but also on the contribution of individual members in a group.

Observation 7 Finland Vinturri, 0+1+2, Maths

12.15 T starts the lesson about mathematics. She writes numbers on the blackboard 11,12,13,14,15,16,17,18. The class started to play an educational/mathematical game with these numbers. Pupils sit in pairs.
12.20 Teacher asks one pupil to go to a room adjacent to the bigger classroom. This pupil is from the first grade and T tells her to complete work in her mathematics workbook.
12.35 T gives a small bag to pupils which includes ten-models (mathematical model for number ten) T tells students to make maths examples or problems using the bag.
12.35 Pupils are trying and making estimations
12.40 T starts to teach about multiplying. T asks a pupil to come to the blackboard and do an example 10*8 T asks pupil to make sums first 40+40, 10+10+10+10+10+10+10+10=80 T tells the other pupils to follow their work. T asks the pupil to come and show the others 3*10 with the help of a ten model (Unifix models) T tells the pupils they should use mathematical language the whole time when showing examples. Each pupil comes and does the same thing. The atmosphere is calm and good except one boy who is trying to get attention all the time
12.50 T asks pupils to read out loud what they have just done (all the multiplications and sums)
12.52 T gives pupils an exercise sheet and asks the pupils to explain what to do next
12.55 T helps the pupils to do it (exercise sheet) T gives homework for pupils (10 multiplication sheet) T has checked and corrected the math books and every pupil has some corrections to make. Homework is given for everyday except weekends. As it was the last lesson for the day and pupils shake hands with the teacher. T lesson ends
13.00 End of lesson

Observation 8 Vinturri, 3+4+5+6, Finnish Language and Maths

Grade 3 has 6 pupils; Grade 4, 3 pupils; Grade 5 2 pupils and Grade 6 6 pupils

12.15 T starts the lesson. G5-6 are studying maths and G3-4 Finnish. T tells the fifth grade what they should do first, and the pupils start their work in their exercise books. T tells them that if they get ready they should go ahead to another exercise. Although both Grades 5 and 6 are studying maths they are working on different exercises at different levels.
12.20 G 3-4 are starting to learn about mother tongue (Finnish language) T is teaching without blackboard or anything else (just orally) Pupils work independently all the time.
12.25 G 3-4 begin to do a worksheet about what they have just learned
12.30 One pupil from G3-4 did not understand and teacher started to help him. T helps also G5-6 pupils with the mathematics
12.40 T started to tell (G5) about the coming math-test (What it is will involve etc.) T informs G6 about the math test 12.45 G3-4. T asks how their work is doing. Nobody asks any help. G5-6 start to check their work. One G5 girl goes to teacher and asks how to do the exercise. T starts to check G3-4 mother tongue exercise work 12.50 More and more G5-6 are getting ready with their work and they too start to check their work. (There are special books for checking the correct answers) T informs G3-4 them about literature and reading week, in the following week. 12.55 T tells about warming system of the schoolhouse and about the week the class is going to study outside the school.

Observation 9 Vinturri, 0+1+2 (7-9 years), Maths

Duration 40 minutes

The classroom layout was very creative with many features characteristic of good quality multigrade teaching. There was a small adjoining room to provide additional working space. The furniture was arranged for small group work and the lesson started with children sitting with teacher on a mat on the floor with cushions. Teacher explained what activities they were going to do and said that they did not need to finish all the activities today. She then took the whole class around each of the activities to explain what they should do. She organised them into groups of 2 and 3 based on similar levels of ability and provided separate activities for grades 1 and 2. There were 9 children present in the class, 1 pre-schooler, 4 in grade1 and 4 in grade

2. The one pre-school child (grade 0) was put into a group with grade 1 pupils. Children then started their activity by taking a numbered card from the black board and finding the table on which the activity (a task card and equipment) had been laid out. When they had finished that activity they took their card back to the blackboard and changed it for another. One activity involved the use of ICT. There was a computer corner in the classroom and children were using a software programme to help them learn how to draw shapes. Whilst the children were working on the maths activities the teacher provided individual assistance to pupils. This lesson demonstrated many of the innovative ideas presented in the MUSE training programme on the organisation and management of teaching in the multigrade classroom.

There was one pupils with special needs in this classroom – he was unable to read and constantly seeking attention. He receives weekly visits from a special needs teacher in Kaustinen and some daily support from a teaching assistant but the school would like him to have more frequent support. The organisation of teaching and learning during the maths lesson enabled this child to join in and he was well accepted by the pupils in his group.

At lunch-time the furniture was quickly rearranged so that the desks were in a horseshoe shape, indicating the flexible use of space and furniture.

Observation 10 Vinturri, Grades 3+4 Biology (10-11 years); Grades 5+6 Maths (12-13 years).

Duration 1 hour

Grades 5+6 were seated traditionally in rows facing the front and spent the lesson working individually from the text book on differentiated tasks. Individual help was given to pupils by the teacher and the teaching assistant. On the other side of classroom grade 3+4 pupils were seated in three groups around biological specimens (stuffed birds) which they had to draw and label with help from the textbook. They stayed on task for the entire one hour lesson with very little support being given. A two-year curriculum span was used so that these pupils could work on the same content. There was no use of ICT in this lesson.

Unfortunately there was no time in the schedule to interview the teacher and it was not clear exactly how much of the training programme he has followed. From the classroom observation he does not appear to have been very much engaged with the project and the teacher educator commented that he did not feel the teacher had learned much from the training. The teacher has spent his entire childhood and teaching career in multigrade classes.

Observation 11 Salakos, 1+3+4, Language

Grades C+D (3+4) is the class commanding most of the teachers attention. Grade A (1) is the silent group. Grades C+D are taught ‘as one’. Duration 1.5 hours.

This was a double language lesson focussed on the two upper grade, C+D. The teacher was teaching the content for the first time ever, this being only her fourth day of primary school teaching. The youngest pupils, themselves just 4 days into the formal classroom, were, officially in the ‘silent’ group for the double period. During this time they were introduced to and practised the writing of two of the letters of the

Greek alphabet. With Grades C+D the teacher followed the structure of the lesson dictated by the pupil texts very closely. Though Grade A was officially the 'silent' group this did not mean that they were ignored by the teacher. On the contrary, the teacher paid Grade A pupils a good deal of attention, and moved regularly between the two groups. The dominant talk throughout the lesson was that of the teacher, and it was clear that the teacher was constantly and actively engaged. The lessons were strongly directed by the teacher, and the lesson plan for C+D was, in turn strongly determined by the pupil text. There was little talk between the pupils, and little opportunity for them to initiate questions of the teacher. The length of the lesson (1.5 hours, with no break) in which the Grade A pupils were expected to engage in letter writing was, in the view of the observer, excessive. The pupils, one by one, began to seek Teacher approval and attention, as they began to finish or tire of the set tasks. Once they had finished there was little other activity to command their attention.

C+D (Grades 3 and 4) (T-active) Grade C 6 pupils (2 girls 4 boys) Grade D 8 pupils (5 girls, 3 boys)	**A (Grade 1) (silent group)** 5 pupils (2 girls, 3 boys)
8.50 T asks pupils to open language books and read. Pupils start to read.	
8.51 Pupils continue reading.	T draws letter on blackboard, demonstrating to the 5 Grade A pupils how to form the letter in their workbook. Pupils start to work.
8.55	Principal enters classroom to collect materials – looks at pupils work and gives 'bravo' encouragement to each pupil in turn. T talks to pupils.
8.56 T begins her input. Changes date on blackboard. Discusses the forthcoming language lesson.	Pupils work in copybooks.
8.57 T Starts dictation. Pupils listen and write in their exercise books in total silence.	
8.59 Pupils write	T moves across to Grade A, her attention attracted by two boys, one of whom is playing with a zip on the others' jacket. T helps boy take off the jacket.
9.00 T returns to C+D and dictates more words.	Pupils listen to T (as she gives C+D dictation). One pupil calls out an answer to one of T's rhetorical questions to C+D. Pupil calls T over.
9.01 Pupils write	T returns to Grade A and writes a second letter on the blackboard, then stands with her back to the pupils and draws the letter in the air.
9.02 T moves back to C+D and dictates. Pupils are silent and work.	
9.03 T starts to move back and forth frequently between C+D and A. T holds the dictation book in hand and reads out from it occasionally while attending to A.	T asks pupils to bring their exercise books to her desk, in turn. T draws a series a dots in each, the dot being the point on the page from where the new letter must be formed.
9.05 T asks pupils to take turns in	T is called over by one pupil.

reading out loud one sentence. One girl starts, a second takes over…the relay continues.	
9.07 The reading relay continues.	T's attention is caught by one pupil whose work is being interfered with by another. Pupils are becoming disengaged and bored.
9.09 T hears a tractor pass by and makes reference to it. Pupils smile and continue to read in relay.	T continues to draw dots in each pupil's exercise book. Pupils by now are working at different speeds, with one pupil working and finishing very quickly; another not on task .
9.14	T prepares dots in book of pupil not previously on task. Pupil settles to work. T tells pupil who has finished to take out his drawing work.
9.16 T moves the language lesson to next phase and reads from the book in an interesting/engaging manner, posing questions.	All grade A pupils eaves-drop on the C+D lesson and join in when T poses questions.
9.19 T poses questions that elicit individual, then chorus responses	
9.23 T writes grammar on board. Pupils work through text, underlining points of grammar.	
9.25	T asks pupils to bring books for correction. She speaks to them individually and in pairs, and gives written and oral feedback.
9.35 T talks to C+D	T is distracted by Pupil's attention seeking. Pupil begins to cut up his picture.
9.38 T introduces a further point of grammar.	
9.43 T begins a review of the pupil exercises.	Pupils disengaged.
9.45 T distributes a worksheet. One pupil claps. Pupils work on worksheet to end of lesson.	
10.05 T reviews exercises.	Pupils very bored and disengaged. Pupils begin to put away books and pack their school bags for close of lesson.
10.20 Lesson ends.	

Observation 12 Salakos, 2+5+6, Language

Duration 1 hour

This was a double language lesson focussed on the two upper grades, E+F (5+6). The teacher followed the structure of the lessons dictated by the pupil texts very closely throughout the lesson. It was clear that the pupils were very accustomed to this style of teaching and had been trained to have their textbooks open at the

relevant page before the teacher entered the room to start the class. Pupils worked individually and remained seated throughout the lesson. The teacher moved frequently between the grades checking work done, setting new work and occasionally stimulating discussion. The teacher injected considerable personal energy into the room and remained totally engaged throughout. Opportunities for creative pupil led activity or group-work were not included.

Grades E and F (5+6) were seated separately but taught together following the lesson set out in the Grade E (5) textbook. The teacher devoted roughly equal time during the lesson to direct teaching of grade B (2) and direct teaching of Grades E+F (5+6). T introduced each section of the lesson, stimulated brief discussion about the text, checked responses to the exercises and helped children with any difficulties. Pupils not being directly taught were involved in 'silent learning' activities which mostly involved reading and doing exercises from the textbook.

All pupils spent a high percentage of time on task and were enthusiastic learners. There was a relaxed work-like atmosphere in the room. Children behaved respectfully towards each other and the teacher and this was reciprocated.

	Grade B (2) (Silent group) 5 pupils (2 boys and 3 girls)	**Grades E and F (5+6)** E - 9 pupils (4 boys and 5 girls) F - 7 pupils (4 boys and 3 girls)
11.10 am	Pupils waiting with language textbooks, note books and pencils out on their desks. T tells pupils to silently revise previous language lesson in text book.	Pupils ready and waiting with language textbooks, note books and pencils out of their desks. T gives dictation.
11.13 am	T tells pupils to read out loud in turn from textbook.	T tells children to read own dictation, check it against textbook and make corrections then read silently from textbook whilst T marks their dictation.
11.30 am	T tells pupils to read silently from textbook.	T turns to next lesson in Grade E (5) text book. Asks pupils to say what they think the first picture is about. T then introduces lesson.
11.25 am	T reads out spelling words for pupils to write down. T helps a slow learner. T marks spellings whilst pupils take turns reading out loud the new lesson from the text book. T helps slow learner again.	T tells pupils to do follow up exercises from text book then copy some text into note books. Pupils work quietly.
11.30 am	T reads the lesson again to pupils and asks questions to stimulate a discussion about it. T uses blackboard to do grammar work on the use of accents and questions. T congratulates pupils loudly on good work and asks grade E+F pupils to give them a clap.	

11.45 am	T tells pupils to silently do exercises from text book and briefly checks on their progress from time to time**.**	T leads pupils through next section of text in the textbook. T uses blackboard to teach distances and speeds that ships travel and then asks pupils to summarise the text out loud. T explains text and checks recall – children answer together.
11.55 am		T tells pupils to silently do exercises from textbook while he checks on Grade B's progress.
11.57 Am		T asks questions to check answers to exercises and asks one pupil who has all correct answers to read them out for the rest of the group to check theirs and make corrections.
12.00 noon	T checks their exercises and then asks them to write about what they will tell their parents about this lesson.	T tells pupils to do next set of exercises from textbook.
12.05		T asks questions to check answers to exercises and asks one pupil who has all correct answers to read them out for the rest of the group to check theirs and make corrections.
12.10 pm	T gives homework activity (This is not a compulsory activity).	
12.12	T ends lesson and gives pupils 20-minute break before next lesson.	

Observation 13 Salakos, 2+5+6, History and Language

Duration 1 hour

This was a double history lesson focussed on the two upper grades with language work set for silent study by grade B (2). The lesson teacher led with the ICT materials being used by the teacher to present additional content and interest. Pupils had little opportunity to interact with the teacher or the visual material during the lesson. They enjoyed the projected images together with the short bursts of sound and aural commentary but found it difficult to sit and listen for an hour.

Grade B (2) pupils were initially interested to watch the ICT presentation but quickly got bored and went back to doing their grammar activity. This did not occupy them for the whole lesson and after they had finished their work they sat quietly but did not appear to be paying attention to the history lesson.

27/9/03	**Grade B (Silent group) Language** 5 pupils (2 boys and 3 girls)	**Grades E and F , History** E - 9 pupils (4 boys and 5 girls) F - 7 pupils (4 boys and 3 girls)
11.20 am	T gives pupils a grammar exercise to do from the textbook but also	T puts CD into computer and projects first slide onto screen using data projector. The computer image is distorted because it is projected onto a rather crumpled paper screen at an angle.

	says they can watch the history pictures if they want. Pupils follow the history presentation with interest for the first ten minutes of so and then individuals start to return to working on their own grammar exercise from the textbook. By the end of the lesson only one child, a slow learner is still doing the grammar lesson, other pupils have completed the work and are sitting idly.	T introduces lesson: 'Today we are going to make a small journey to the Roman Empire' and shows first slide. The slide is accompanied by music and bursts of commentary that run for approximately 30 seconds at a time. When the commentary finishes T talks about the content of the slide for about 4 minutes before moving onto the next slide. This pattern continues for another 50 minutes until the end of the lesson with T using the projected slides to support his verbal presentation on the Romans. Occasionally T asks pupils brief recall questions and on one occasion T stops his presentation to ask one boy in grade E to come and solve a simple jigsaw puzzle on the computer. The image is projected and the boy quickly puts the pieces together correctly using the computer mouse to move them around. Pupils are attentive for the first 30 minutes or so of T's presentation and then become increasingly restless. When the commercial CD is finished T continues his presentation with projected material (text and pictures) he has personally downloaded from the internet – the pictures are rather small and the text very small.

Observation 14. Salakos, 2+5+6, Maths and 'free choice'

Duration 20 minutes

For Grade F (6) Maths was the main focus of the teaching input during this lesson. The topic was 'number', the first topic for the new academic year. Grade B (2) were also timetabled for Maths, but 'silent' Maths. Grade E (5) were 'free' to do whatever they wished, quietly and with no input from the teacher. Maths, the subject which must be taught separately to each grade, is timetabled for the active group and the 'silent' group. Despite the 'silence' the teacher clearly makes regular and frequent inputs to this group. Only the 'free choice' group receives no attention from the teacher beyond the initial introduction.

	Grade B (Silent)	**Grade E (Free)**	**Grades F**
	5 pupils (2 boys, 3 girls)	9 pupils (4 boys and 5 girls)	7 pupils (4 boys and 3 girls)

13.24 pm	T tells pupils to read page 1 of their Maths book. Pupils start to open and read material with little instruction from T.	T tells pupils they have free choice and they start to take out their chosen work and engage with it. One child is reading a library book, a second draws, a third colours a line drawing, a fourth reads silently, a fifth traces a picture from a book, a sixth is rummaging in his bag, while a pair draw, colour and fold paper (which turn out to be 'love letters' to the teachers). Pupils continue with their 'free' work and engage in quiet chatter as they work. Apart from the pair who present their love letters to the teacher the others are doing different things, some are very engaged, some less so.	T engages pupils in questions and answers on the significance of numbers – places, street numbers, time etc. Sometimes questions are posed and answered individually; more often to and by the group.
13.25 pm	Teacher gives a brief instruction 'to start to do the exercise on their own'.		T returns to Grade F, poses question, pupils laugh and answer.
13.26 pm			T writes cardinal numbers on black board and engages pupils in questions and answers. Pupils talk to each other, actively, loudly. T explains what they should do in their books.
13.28 pm	T gives support and pupils continue to work individually and quietly. Though this group is 'officially' allocated low T input, T does his best to give them attention and check their work whilst spending most time with grade F pupils.		Pupils work alone. Though seated in a group, they undertake their tasks individually and for the most part, silently. T gives individual support whilst pupils work individually on exercises in the prescribed text. T makes brief visits to grade B to check on their progress.
13.35 pm			T reviews work with pupils. Poses questions to all pupils in the group and receives 'chorus' responses. They continue the exercise and initiate questions to T. There is more apparent earner activity than in the previous lesson.
13.44pm	Lesson ends. Some pupils put their chairs on tables and walk out. T calls them back, brings them together for a closing prayer, sung in unison.		

Observation 15 Salakos, 3+4, Language

This was a double language lesson in which the two grades were taught together. This was an engaging lesson to watch, strongly directed by T but with ample scope for pupil's engagement both in the whole class, question and answer sessions and individual exercises.

Normally (but not this morning) the lesson would start with reference to the preceding days work and homework – dictation, spellings, reading out some of the previous day's work and homework. c. 15 mns.	
10.35 am	T explains what he plans to do in the lesson and engages pupil's interest in the story he is about to tell, by asking some questions about the forthcoming holidays and the sea. He reads the story 'The sea is my mother'.
10.39 am	T asks pupils to read the story, silently.
10.42 am	T asks what are the new words in this story. Several T questions followed by pupil(s) responses.
10.44 am	T asks pupils to turn over the page to the exercises. T asks various questions: What impressed you about the story? What is the sentence that best expresses the author's admiration of the sae? What are the games one can play in water? (hugely enthusiastic response from all pupils) .
10.51 am	In the course of discussion T refers pupils back to a history lesson about the Greeks and their long maritime history.
10.53 am	T moves on to grammar – about conjunctions. T writes a sentence from the story on the board, and another. T does not give the rule but tries to help pupils learn the rule inductively rather than deductively. T writes the grammar rule to the left hand side of the board.
10.57 am	Pupils do the exercise for themselves.
11.14	Pupils do more exercises.
11.15	T encourages the children to solve the exercise orally before writing
11.20	Lesson ends

Observation 16 Bolonia, 7+8, Environmental Studies

Day 1 Field work

The head teacher, is also a class teacher for the 'junior secondary class' grades 7 and 8, age 13-14 years. The pupils in grade 7+8 are timetabled for a whole day cross-curricular activity in environmental studies. This activity will include botany, history, geography, mathematics and physical education. The pupils in the classroom prepare to go out to the sand dunes to start their activity – they are led by their class teacher who is also the head teacher and two female teachers also accompany the group (they go by car). They get onto their mountain bicycles and (later) arriving at the first field site where they study local plants. They have a digital camera to record plants for their report and some reference books to identify the plants and learn more about them. Each pupil has a field notebook to take notes

The group then move on to a new site to study anthropomorphic tombs. They draw maps of the area – using a compass to give the correct direction. They measure the tombs and take readings on a geographical placement satellite tool. The teacher gives then constant support and feedback on their work so that they can make any necessary revisions. Pupils work sometimes individually and sometimes in groups – they mostly choose to work in single sex groups.

At the end of the day the teacher leads a discussion to agree the timetable for the class to write up their project and decide what groups the pupils will be working in.

Day 2 Writing up the fieldwork

Lesson 1 Following up the fieldwork. Grades 7 and 8

This is a long lesson lasting most of the morning. It starts with input from the teacher to review what they had agreed yesterday about writing up the project and some additional input on anthropomorphic tombs. Some pupils are going to be writing up the flora from the sand dune and they continue working on this using reference books. Finally the pupils split up into their interest groups and begin work on the report writing using the computers.

Observation 17, Bolonia, 7 and 8, Maths

The grades are working on different tasks but each pupil works individually from the textbook throughout the lesson. The teacher sets the tasks at the start of the lesson and then goes around giving individual help as needed. The pupils are very restless at the outset and become increasingly so as the lesson proceeds. Very little time is actually spent on task.

5.2 Analysis of class observations

The seventeen lessons above demonstrate the diversity of multigrade class organization. There is no single form of organisation. The number of grades per class varied from 2 to 4. The average class size was small, around 18-20. Only the classes including the preschool grades were smaller than this. Only in Finland was the teacher supported, sometimes, by a classroom assistant. And this support was observed only in the larger of the two schools. In the small Vinturri school a class assistant was available only on some days for some subjects.

The largest number of grades combined (4) was found, as one would expect in the school with just two teachers. This was in Vinturri in Finland. In Greece, where there were also only two teachers at the time of the September 2003 observations, there was also a separate pre-school and separate preschool teacher. The Greek teachers managed 3 primary grades each whereas one of the Finnish teachers managed 4 grades and the second 3 grades (including the pre-school grade).

Just under half the observations involved combinations of 2 grades, two combinations of 4 grades and the remainder combinations of 3 grades. Where, as in the Greek cases, there were 3 grades in the same class these were then further recombined into a group comprising the youngest grade and a group combining the two oldest grades.

In the majority of lessons observed the same subject was timetabled for all grades at the same time. The exceptions to this were in the 4-grade class in Finland where two groups of two grades each followed Finnish or Maths in one lesson; Biology or Maths in another; and Greek and History in one lesson in Greece. In some subjects pupils in combined grades followed exactly the same lesson as their peers in another grade. This was true in Finland, for Biology (3+4) and Environmental studies (5+6); in Greece for the Greek language (3+4) and History (5+6); and in Spain for Environmental studies (7+8). In Finnish language teachers often provided common introductions, followed by grade-differentiated tasks. This was also true for Mathematics in Finland and Spain, though Observation 4 suggests that the maths

activities were separated by grade from the start of the lesson. Only in Greece were teachers required by Ministry regulation to teach Maths in separate grades. Observation 14 illustrates how this was achieved in a 3 grade class. Grade 2 works on maths 'silently' (with minimal teacher support); Grade 5 pupils have a free choice of independent work (with no teacher supervision); and Grade 6 maths is teacher-directed

Figure 9 below summarises the characteristics of the classes observed

Figure 9 Class observations, by class size, teaching assistant, grade combinations and subjects taught

Class	Grades in class	Pupils in class	Teacher Asst. available	Grade combinations	Subjects	Comments
1	2	18	Y	3+4	Biology (all)	2 year curriculum
2	2	18	N	5+6	Finnish (all)	2 year curriculum –
3	2	18	Y	3+4	Finnish (all)	Common introduction, tasks differentiated by grade
4	2	20	Y	1+2	Maths (all)	Grade 2 revision activity
5	2	10	N	Preschool	Mixed	Whole class
6	2	20	Y	5+6	Environmental studies (all)	7-step enquiry process. 2 year curriculum cycle, whole class, small group and individual work
7	3		?	0+1+2	Maths (all)	Paired work and individual work sheets
8	4	17	?	3+4+5+6	Finnish (3+4) Maths (5+6)	
9	3	9	N	0+1+2	Maths (0+1) (2)	Graded activities
10	4		N	3+4+5+6	Biology (3+4) Maths (5+6)	2 year cycle for Biology Maths: grade differentiated pupil tasks
11	3	19	N	1+3+4	Greek (1, silent) Greek (3+4)	As per Ministry guidelines
12	3		N	2+5+6	Greek (2, silent) Greek (5+6)	As per Ministry guidelines
13	3	21	N	2+5+6	Greek (2, silent) History (5+6)	As per Ministry guidelines
14	3	21	N	2+5+6	Maths (2, silent) Free choice (5) Maths (6)	As per Ministry guidelines
15	2		N	3+4	Greek (3+4)	Whole class, questions and

						answers, individual pupil work
16	2		2 additional Ts joined field work	7+8	Environmental studies (7+8)	Pupils work in self-selected groups, also some whole class teaching and individual pupil work
17	2		n	7+8	Maths (7+8)	Grade-differentiated work

5. 3 Teacher management of time

How do teachers manage their own time to ensure that all pupils are 'on task' even when their work is not directly managed by the teacher? In what type of activities are pupils engaged when a teacher works with another group? These are the types of questions young and inexperienced multigrade teachers pose.

An analysis of the observations of the practices of multigrade teaching indicates a number of strategies used by the teacher.

As noted already in the previous section a number of the lessons observed involved the teacher treating the combined grades 'as one'. Subjects such as environmental studies (in Finland and Spain) and History in Greece are taught on a 2 year cycle. Some pupils begin the cycle at the 'beginning'; the others half-way through. The teacher treats the class in a way that differs little from a conventional mono-grade class. Nonetheless, even in these settings pupils spend much of their time learning without constant direct input form the teacher. This is an important point, since many teachers and teacher educators believe that pupils in multigrade classes suffer because they receive only a fraction of the teacher-input to the monograde class. They reason that pupils only learn when the teacher is talking. Clearly this is not the case and it is worth outlining the use of pupil time and the strategies employed by the multigrade teacher in those lessons that resemble a monograde class, in particular Observations 1,2,6,10,16.

Note in these lessons

- The amount of time spent by pupils working independently
- The amount of time spent by pupils working in groups
- The amount of time spent by pupils listening to the teacher

Note also who or what is supporting pupil learning. Note the support for pupil learning offered by

- pre-prepared worksheets
- the textbook
- the teaching assistant (Finland)
- computer software

Note also how, in Observation 16, the cross-curricular activity in Spain, the teacher 'negotiates' a timetable of individual and group work on the second day of activity.

These strategies are observed, to varying degrees, in the lessons where the class is treated as one. They are sound strategies and similar to those used in conventional monograde classes. They shift the immediate direct support for the learning activity to the pupil him or herself, in combination with written or digital text (worksheets,

textbooks, software). In the case of Finland, the teaching assistant also plays a role in supporting pupil learning in the absence of the formal class teacher.

These strategies are used to an even greater in the multigraded lessons i.e. those in which the teacher addresses different subjects in the same timetabled period or different levels of the same subject. But in addition one should note the following.

- Teacher uses common introductions to lessons for the whole class, followed by tasks differentiated by grade level (e.g. Observation 4, 9). These differentiated tasks have been planned in advance by the teacher

- Pupils manage resources through selection device designed by the teacher (Observation 9)

- Teacher moves frequently between grade groups, ensuring that pupils in the non-attended group are engaged in learning activity (see in particular Observation 12 for an example of intensive activity by the 'silent' group – and Observation 11 for less intensive activity)

- The teacher and pupils have established 'routines' built into lessons. Even young pupils have their books open, pencils and notebooks to the ready before the teacher enters the class (Observation 12)

- Routines established by the teacher help pupils to learn to work independently (as demonstrated by the 'free choice' quiet activity of G5 in Observation 14)

- Pupils learn how to manage classroom space and resources (Observation 4)

- Pupils learn to self evaluate their work, supported by pre-prepared answer books (Observation 8)

- Pupils 'eaves drop' on lesson of other grade and become aware of common and differentiated learning (Observation 13)

5.4 DVD plus commentary – a training tool for the future

One outcome of the class observations has been the production of a DVD, with written commentary, illustrating many of the above principles. Based on edited observations, recorded digitally by PP and AL, the DVD has many functions. It may be used as an illustrated lecture on multigrade practices in Finland, Greece and Spain, using the written commentary as voice-over. It may be used in this way by those who have and even those who have not participated in the project.

In addition it has more flexible uses. It may be used with no commentary at all, with viewers encouraged to observe and raise their own questions. It may be used with the pause function, to reflect on particular points/raise questions. It may used discretely with a focus on one country, one subject, one grade combination. It may used in combination with the text outlined in 5.2 and 5.2 above to construct learning activities for teacher trainees.

The Commentary for the DVD is presented in the following box. The DVD is submitted to the Commission as a separate item.

Commentary to accompany the MUSE DVD

1. Introduction

The overall aim of the MUSE project is to develop and evaluate an innovative training programme for teachers in the 4 project multigrade schools. One school is in Greece, one in Spain and two in Finland. The training programme has been delivered through open and distance learning (ODL) and it aims to improve classroom pedagogy, the use of ICT in the classroom and enable teachers to design and use cross curricula projects that include the use of ICT. This video was produced as part of the evaluation materials for the MUSE project.

2. Salakos School, Rhodes, Greece

The film was made in September 2003. It starts with a view of the school at the beginning of the school day showing the large playground. There is also a separate area with play equipment (swings etc.) and rose bushes, lemon and orange trees and other plants. The plants are looked after by the children who have formed an association to market their products mostly to their parents. The modest earnings are spent on school activities. The school has two teachers (including the head teacher) and at the time of the visit in 2003 there were 41 pupils (20 boys and 20 girls) in 6 grades, A-F, and two spacious classrooms. These grades correspond to Grades 1-6 in education systems elsewhere. The school is very well endowed with material resources, computers, video, TV, data projector, scanner, telephone. (There is also a kindergarten class that is not part of the school)

Salakos school follows the Greek National Curriculum, in line with guidance from the Ministry of Education on how this should be done in multigrade schools. In a 2 teacher school the recommended grade groups are (A, C, D) and (B, E, F).. In the classroom with grades A,C,D the teacher teaches grade A as one group and grades (C+D) as another. In the classroom with grades B,E,F the teacher teaches grade B as one group and grades (E+F) as another. At any one time one group (whether a single or combined graded) is working with the teacher, while the other group engages in 'silent' work. The principle behind the separation of A and B into two separate teaching groups is the need to have graded inputs from the teacher and the difference in level of learning of the pupils.

Subjects and Grades: For grades (C+D) and (E+F) the Ministry recommends that pupils follow a two year curriculum cycle (learning the same subject at the same time and being treated as if they were a single grade). In practice this means that in one year all pupils in (C+D) (whether they are grouped in the same classroom with A, or alone) will follow the subject curriculum for grade C; in the following year the curriculum for D. In effect this means that in one year all pupils in the C+D combination follow the grade C curriculum and in the following year, the D curriculum. Dependent on the year of entry to grade C a pupil may work through the curriculum in reverse order i.e. grade D followed by C. The exception to this principle of combined grades is the subject of Maths. The Maths curriculum is strictly 'graded' and it is assumed that pupils will work through it in the sequence A-F. Its design does not permit reverse ordering of adjacent grades. In the case of Maths all grades, whether A-F, should be treated separately, with one grade group receiving direct tuition from the teacher while the other grade(s) engage in 'silent', individual work, or study/activity outside the classroom.

Lesson 1 Grades A, C, D Subject: Language (C and D), Formation of letters from Greek alphabet (A)Time one and a half hours.

This was a double language lesson focussed on the two upper grade, C+D. The teacher was teaching the content for the first time ever, this being only her fourth day of primary school teaching. The youngest pupils, themselves just 4 days into the formal classroom, were, officially in the 'silent' group for the double period. During this time they were introduced to and practised the writing of two of the letters of the Greek alphabet. With Grades C+D the teacher followed the structure of the lesson dictated by the pupil texts very closely. Though Grade A was officially the 'silent' group this did not mean that they were ignored by the

teacher. On the contrary, the teacher paid Grade A pupils a good deal of attention, and moved regularly between the two groups. The dominant talk throughout the lesson was that of the teacher, and it was clear that the teacher was constantly and actively engaged. The lessons were strongly directed by the teacher, and the lesson plan for C+D was, in turn strongly determined by the pupil text. There was little talk between the pupils, and little opportunity for them to initiate questions of the teacher. The length of the lesson (1.5 hours, with no break) in which the Grade A pupils were expected to engage in letter writing was, in the view of the observer, excessive. The pupils, one by one, began to seek teacher approval and attention, as they began to finish or tire of the set tasks. Once they had finished there was little other activity to command their attention.

Lesson 2 Grades B, E, F Subject: Language. Time one hour

This was a double language lesson starting with dictation to the two upper grades, E+F whilst the younger group Grade B did 'silent' work from the textbook. The teacher (who was also the head teacher with 16 years experience in the school) followed the structure of the lessons dictated by the pupil texts very closely throughout the lesson. It was clear that the pupils were very accustomed to this style of teaching and had been trained to have their textbooks open at the relevant page before the teacher entered the room to start the class. Pupils worked individually and remained seated throughout the lesson. The teacher moved frequently between the grades checking work done, setting new work and occasionally stimulating discussion. The teacher injected considerable personal energy into the room and remained totally engaged throughout. Opportunities for creative pupil led activity or group-work were not included.

Grades E and F were seated separately but taught together following the lesson set out in the Grade E textbook. The teacher devoted roughly equal time during the lesson to direct teaching of grade B and direct teaching of Grades E+F. The teacher introduced each section of the lesson, stimulated brief discussion about the text, checked responses to the exercises and helped children with any difficulties. Pupils not being directly taught were involved in 'silent learning' activities which mostly involved reading and doing exercises from the textbook.

All pupils spent a high percentage of time on task and were enthusiastic in their learning and there was a relaxed work-like atmosphere in the room. Children behaved respectfully towards each other and the teacher and this was reciprocated.

Lesson 3 Grades B, E, F Subject: History (E,F) Language (B.) Duration one hour.

This was a double history lesson focussed on the two upper grades with language work set for silent study by grade B. The lesson was strongly teacher led with the ICT materials being used by the teacher to present additional content and interest. Pupils had little opportunity to interact with the teacher or the visual material during the lesson. They enjoyed the projected images together with the short bursts of sound and aural commentary but found it difficult to sit and listen for an hour.

Grade B pupils were initially interested to watch the ICT presentation but quickly got bored and went back to doing their grammar activity. This did not occupy them for the whole lesson and after they had finished their work they sat quietly but did not appear to be paying attention to the history lesson.

Lesson 4 Grades B, E, F. Subject: Maths (F) Free choice (E) Maths (B). Duration one hour
For Grade F (6) Maths was the main focus of the teaching input during this lesson. The topic was 'number', the first topic for the new academic year. Grade B (2) were also timetabled for Maths, but 'silent' Maths. Grade E (5) were 'free' to do whatever they wished, quietly and with no input from the teacher. This is another type of classroom organization in the Greek multigrade class. Maths, the subject which must be taught separately to each grade, is timetabled for the active group and the 'silent' group. Despite the 'silence' the teacher clearly makes regular and frequent inputs to this group. Only the 'free choice' group receives no

attention from the teacher beyond the initial introduction.

Lesson 5 Grades C,D. Subject: Language (C+D). Duration one hour

In this lesson the two grades were taught together as in a monograde class. This was an engaging lesson to watch, strongly directed by the teacher but with ample scope for pupil's engagement both in the whole class, questions and answer sessions and individual exercises. But this level of teacher involvement lesson after lesson and in split group Maths would (we think) be fairly tiring.

Summary

The five lessons presented in the video demonstrate four forms of classroom organization in the Greek multigrade class. Lessons 1 and 2 involved three grades studying the *same* subject, but with the older children grouped together as if one grade, and the younger working as the 'silent' group. These groups worked on different language material and at different cognitive levels. The older groups worked on the same language material. Lesson 3 also involved 3 grades, but with the older and younger groups following *different* subjects. Lesson 4, again with 3 grades, demonstrated a different type of organization again. Here, the grade groups were treated separately, with one of the older groups left completely 'free' to choose their learning activity. The subject- Maths- was the same for the oldest and the youngest group, but taught separately, with most attention, in this lesson, being given by the teacher to the oldest group. Finally, Lesson 5 was the form of organization used for the subject of language, in a 3-teacher school. Here the teachers work with just two grades each, and, in the case of language, teach the pupils as is they were one grade.

We do not regard these four forms as exhaustive. There will be additional forms in Greek 1, 2 and 3 – teacher schools. Likewise we expect there to be many forms of organization in the Spanish and Finnish schools – and we see part of the purpose of these school case studies to identify the diversity of classroom organization.

3. Bolognia School, Spain

This is one of three schools forming C.P.R. Campiña de Tarifa located south of Cadiz on the west coast of Spain. There were 97 students at the school at the time of the visit in 2004, of which 33 are of other nationalities (some with a Spanish parent). The school has an infant class, 3 primary classes and one 'junior' secondary class and there are 7 full-time teachers, 2 assistant teachers and 3 peripatetic teachers. The video starts with a view of the school bus bringing children at the start of the school day – it shows the main school building with the infant class to the left in a separate building.

Cross-curricular environmental studies activity. Grades 7 and 8

Day 1 Field work

The head teacher, is also a class teacher for the 'junior secondary class' grades 7 an 8, age 13-14 years. The pupils in grade 7+8 are timetabled for a whole day cross-curricular activity in environmental studies. This activity will include botany, history, geography, mathematics and physical education. The film begins with the pupils in the classroom preparing to go out to the sand dunes to start their activity – they are led by their class teacher who is also the head teacher and two female teachers also accompany the group (they go by car). We then see them getting onto their mountain bicycles and (later) arriving at the first field site where they study local plants. They have a digital camera to record plants for their report and some reference books to identify the plants and learn more about them. Each pupil has a field notebook to take notes

The group then move on to a new site to study anthropomorphic tombs. They draw maps of the area – using a compass to give the correct direction. They measure the tombs and take readings on a geographical placement satellite tool. The teacher gives then constant support and feedback on their work so that they can make any necessary revisions. Pupils work

sometimes individually and sometimes in groups – they mostly choose themselves to work in single sex groups.

The scene then moves back into the classroom at the end of the day when the teacher leads a discussion to agree the timetable for the class to write up their project and decide what groups the pupils will be working in.

Day 2 Writing up the fieldwork

Lesson 1 Following up the fieldwork. Grades 7 and 8

This is a long lesson lasting most of the morning. It starts with input from the teacher to review what they had agreed yesterday about writing up the project and some additional input on anthropomorphic tombs. Some pupils are going to be writing up the flora from the sand dune and they continue working on this using reference books. Finally the pupils split up into their interest groups and begin work on the report writing using the computers.

Lesson 2 Maths. Grades 7 and 8

The grades are working on different tasks but each pupil works individually from the textbook throughout the lesson. The teacher sets the tasks at the start of the lesson and then goes around giving individual help as needed. The pupils are very restless at the outset and becomes increasingly so as the lesson proceeds. Very little time is actually spent on task.

End of week assembly for Grades 6, 6 and 8

There have been some behavioural problems that the head teacher needs to address. These problems include fighting in the playground and disruptive behaviour in Maths lessons. The head teacher leads a lively discussion to help pupils reflect on how they want to live together in the school. The focus is on treating each other and their teachers with respect and being treated with respect in return.

The kindergarten class before school starts

Children are letting off steam – the boys are being especially rowdy whilst the girls mostly sit quietly wit their fingers in their ears.

Classroom of grades 3 and 4 ages 7 and 8 years

Pupils are sitting in separate grade groups and are mostly taught separately (quasi monograde)

The film ends with a shot of the chicken project funded by the EU.

Summary

Two different teaching styles are represented in this film with the class of Grades 7+8. The cross-curricular environmental studies activity involved pupils in whole class teaching and collaborative small group learning to link learning in the classroom with learning in the local environment. Learning was active and relevant to their specific context. There was effective se of ICT both in the field and the classroom and good use was made of paper-based resources as reference materials. In contrast the mathematics lesson focused on individual learning from workbooks with the teacher supporting individual students.

4. Vintturi School, near Kaustinen in Finland

This small school is more than 100 years old and had 27 children enrolled at the time of the visit in 2004. The film starts with the whole school coming together for morning assembly.

Lesson 1: Mathematics lesson on shapes. Grades 0+1+2 (7-9 years old). Duration 40

minutes

The lesson starts with pupils sitting with the teacher on a mat on the floor with cushions. There are 9 children present in the class (1 pre-schooler, 4 in grade1 and 4 in grade 2). The teacher introduces the lessons, explains what activities they are going to do and says that they do not need to finish all the activities today. She then takes the whole class around each of the activities in turn to explain what they should do. She organises them into groups of 2 and 3 based on similar levels of ability and provides separate activities for grades 1 and 2. The one pre-school child (grade 0) is put into a group with grade 1 pupils. Each group then starts their activity by taking a numbered card from the black board and finding the table on which the activity (a task card and equipment) had been laid out. In the film we see that when they have finished that activity they take their card back to the blackboard and change it for another. One activity involved the use of ICT. Pupils can be seen using a software programme on the computer to help them learn how to draw shapes. Whilst the pupils are working on the maths activities we can see the teacher providing individual assistance. This lesson demonstrates many of the innovative ideas presented in the MUSE training programme on the organisation and management of teaching in the multigrade classroom.

In the class there is one pupils with special needs in this classroom – he was unable to read and constantly seeking attention. He receives weekly visits from a special needs teacher in Kaustinen and some daily support from the teaching assistant in the school. The organisation of teaching and learning during the maths lesson enabled this pupil to join in with his peers and he was well accepted by the pupils in his group.

Lesson 2 Grades 3+4 Biology (10-11 years old); Grades 5+6 Maths (12-13 years old). Duration 1 hour

The teacher of this class has spent his entire childhood and teaching career in multigrade classes. He has a teaching assistant who also give occasional support to the other teacher in the school. At the start of the film we can see that the classroom is laid out in columns and rows for Grades 5 and 6 to work individually from their Maths workbooks. On the other side of classroom grade 3+4 pupils are seated in three groups around biological specimens (stuffed birds) which they have to draw and label with help from the textbook. Pupils stayed on task for the entire one-hour lesson with occasional support being given from the teacher or the teaching assistant both of whom were present in the classroom. A two-year curriculum span is being used for grade 3+4 in Biology so that these pupils can work as one class with the same content. Grades 5 and 6 are working individually.

5. Vionoja School, near Ullava in Finland

The film was made in May 2004 and starts with an outside view of the school and the play facilities. The school has recently been extended with new buildings. It now has 4 classrooms and a large hall for sports and school assemblies. There is a central 'break out' working space that is also used for eating lunch and a spacious area for teachers to work. There is a library that belongs to the commune but is part of the school and available for school use. This library is an ideal place for adults in the to community come and see something of the work of the school.

The film then moves on the show a whole school assembly.

Lesson1: Preschool Grade) (5-6 years)

There are about 10 pupils in this class. The film starts at the beginning of the lesson with the teacher asking the pupils to update the information on the board – the day, date etc. It then moves on to show pupils doing their daily 'gymnastics' to music before doing an activity called 'guess the word' in which the teacher describes an object at the pupils ask question to guess what it is. The film then moves into an adjoining room belonging to this class that was very well equipped area for creative play with a shop, dressing up area, soft toys etc.

Lesson 2 Maths. Grades 1+2 (8-9 years old). Duration 1 hour.

There are 20 pupils in the class and a full-time teaching assistant working with the teacher. A quasi monograde strategy is used for this lesson with grade2 pupils being given a revision activity whilst the teacher gives direct teaching to grade 1 pupils. Grade 2 pupils are dispersed around the classroom and also some other classrooms so that each pupil has a computer with a maths revision programme. The programme is interactive in that it asks them to give answers and then 'speaks' to them saying whether their answer is right or wrong. The teaching assistant spends most of her time supporting the work of grade 2 pupils on the computers. One pupil in this class has learning difficulties and works individually from a maths workbook following a tailor made programme to meet her needs.

Lesson 3: *Mother tongue (Finnish) language. Grades 3+4 (10-11 years old). Duration 1 hour*

There are 18 pupils in the class (10 in grade 3 and 8 in grade 4) and there is a full-time teaching assistant. This was the first lesson of the day and it starts (as always) with a whole class introduction. This morning the teacher reads a short passage from the bible and plays some quiet music. The teacher then conducts a brief whole-class language test asking questions and recording the oral answers on the overhead projector. He then introduces the lesson explaining that pupils were going to be journalists and write articles for a newspaper. The task is differentiated with grade 3 working collaboratively in self-selected small groups to make a poster and grade 4 working in small groups to write articles for a class newspaper. In all groups boys choose to work with boys and girls with girls.

The poster paper was fixed onto the blackboard and divided into sections for news, weather, sports etc. Pupils worked in twos and threes to find or write content for the poster and then stick their contribution on the poster. Grade 4 worked in a similar way but there was more writing of original material and less cutting and pasting of content they had found. Pupils had access to the Internet to find weather information and maps and also to the television text pages to get the latest sports news etc. Additional space was made available to them to cut and paste in the library.

(After one hour the lesson stops for pupils to have a short lunch break and then continues for a second hour (which was not filmed). At the end of this second lesson the class comes together to share the poster and the class newspaper.)

Lesson 4: Environmental studies Grades 5+6 (12-13 years old). Duration 1 hour.

There are about 20 children in this class and a full-time teaching assistant. For environmental studies the teacher uses a two-year curriculum span so that the whole class can work on the same content. An enquiry-based approach is being used for environmental studies. To work through the entire process takes the teacher 4 hours and the film only shows the early stages of this process - steps 1 to 4 in the 7-step enquiry process shown below:

What is the problem/issue to be explored? (Teacher builds the context using books, stories, ICT)
What questions do I want to answer in my enquiry? (Pupils write questions)
What do I know already? What more do I need to find out? (Pupils develop a mind map)
Finding out more (Pupils gather new data using ICT, books etc.)
What did I find out? How do I now see the problem? (Pupils critically reflect on their findings)
What new questions do I want to answer? (Pupils write new questions)
What do I understand now? What is my new theory? (Pupils develop a new mind-map.

The teacher begins by explaining that they are going to start a new enquiry into how to classify insects. She writes the first step on the blackboard 'What is the problem/issue to be explored?' and gives a general introduction using large pictures and charts of insects and digitised material projected onto the classroom wall through a data projector to illustrate the problem/issue. She then moves onto the second step (again writing the question on the board to track the process) and divides the class into groups to work on this enquiry. Each group is set the task of writing a 'learning diary' on 'How to Classify Insects'. One pupil in

each group decorates the front cover of the diary whilst the rest of the group begins to write questions that they want to answer in their enquiry. The next step is to discuss what they already know about how to classify insects and then to develop a mind-map (web-diagram) using this information and to add to this diagram things they want to find out. One person in each group acts as a scribe to draw the diagram and to keep adding to it as the group moves through the enquiry process. At the end of each step in the process the teacher brings the pupils together to move them onto the next step together.

In the next step the group sets about collecting information to answer their questions. To help them do this the teacher provides a range of resource materials. There are 5 computers in the classroom, they have Internet connections and pupils are encouraged to use the 'google' search engine. They also have resources on CD and reference books. One computer is attached to the data projector so that pupils can share information on the large screen.

6. Summary

The lessons shown in the film illustrate a wide diversity of curriculum strategies including whole class teaching, small group work, individual self-study and enquiry-based learning. Two-year curriculum spans are commonly used to avoid teaching across grades in history and environmental studies and music and physical education are taught to whole classes. A further strategy being practiced was to have a staggered start and finish time for the pupils in the different grades in a class so that a teacher only has pupils from one grade to teach during the first and last lesson. In this school each teacher has a teaching assistant to support pupil learning and the school is very well resourced with learning materials including ICT materials.

6.0 Teacher engagement with the new model of in-service training

6.1 Finland

Interviews conducted during the MUSE team meeting in Spain in February 2004 and followed up by visits to both schools in Finland in May 2004 confirmed that both schools had a good level of engaged with the new model of in-service training under the supervision of Juha Paasimäki from the Chydennius Institute. Their engagement was also demonstrated by completion of the full set of module evaluation forms (annex 4) by both schools. In Vionoja School the head teacher, Maila Koivumäki, provided exemplary leadership, involving all teachers in her school in the project as well as being in frequent contact with Leena Harju at Vintturi School to provide advice and encouragement who was new to primary teaching. Pekka Lehto at Vintturi school, a very experienced multigrade teacher, was less involved with the project but demonstrated knowledge of the skills and strategies being taught.

6.2 Greece

Observation and discussions with the head teacher, Dimistris Zoros, before the training programme started showed that he was open to using new methodologies and technologies in his teaching and was ready to engage with the materials. His strong engagement with the training programme was subsequently confirmed by completion of the full set of evaluations of each Unit (annex 4). This teacher was well supported by Alina Konstantinidis and also Kostas Tsokalides at the University of the Aegean in Rhodos.

6.3 Spain

Observation of teaching and interview data collected during a school visit in February 2004 confirmed the engagement of the head teacher, Manuel Quilez Serrano, with this project despite difficulties arising from the lack on an internet connection at the school. He regularly attended the weekly face-to-face meetings with his training supervisor, Raquel Rodriguez, at the University of Cadiz over 80 km away. Engagement was further demonstrated by the completion of a full set of module evaluation forms (annexe 4). Other teachers in the school were only minimally involved in the project through sharing of experiences during staff meetings.

6.4 Synthesis

The four lead teachers (Maila Koivumäki, Leena Harju, Dimistris Zoros and Manuel Quilez Serrano) demonstrated a high level of engagement with the new model of in-service training. In the case of Vionoja school although the lead was provided by Maila Koivumäki all teachers were involved and able to pick up on the ideas taught in the training programme and Mauri Niemistö attended MUSE team meetings.

7.0 Teacher ability to design/implement cross curricula teaching plans

7.1 Finland

The head teacher from Vionoja School, Maila Koivumäki collaborated with the teachers in her school and also with the lead teacher in Vintturi School, Leena Harju, to develop a cross-curriculum project for Easter 2004. Materials from the Easter project, sent to the evaluators and observed during the school visits, together with discussions held with the teachers involved, confirmed their ability to design useful and enjoyable cross-curricula projects. Teachers in Vionja School also designed and implemented cross-curriculum projects on recycling, the weather and seasons in Finland. Detailed feedback on this project was provided on the module evaluation form. Maila Koivumäki uses the enquiry-based approach that is now being introduced into the schools in Finland. Teachers in both schools clearly devoted considerable time and energy to the cross-curriculum projects finding them useful and interesting for their pupils: "*Most of the pupils were very motivated….it was very suitable for non-grade teaching , … pupils learned to use different sources of information and to be critical."*. Extensive feedback was provided by the teachers in their Unit evaluations for cycle A (annex 4)

Both Vionoja and Vintturi schools participated in the cross-curricular Youra project during cycle B of the training programme. Despite initial technical difficulties experienced (e.g. if they clicked on Finland, Germany appeared on the screen) both schools persevered. Feedback (given in annex 4) from the teachers at Niooja School confirmed that the project was very interesting and diverse and that the students were very motivated: *"The lesson plan is very fruitful and good. There are many ways to arrange groups. It is very interesting and diverse".* Both schools felt rather alone in this project because they were the first to input their data. The teachers felt it would have been useful to have all the project schools doing the tasks at the same time so that the students could learn from those in the other countries. In all these cross-curricular projects teachers and pupils drew on a range of ICT (including the internet and front page) and pupils developed 'mind maps' to help them research the topics. These cross-curricular plans brought together language, environmental studies, music, geography, culture and history.

7.2 Greece

Dimitris Zoros designed and implemented a cross-curricular project on 'Plants and their cycle of life' during Cycle A of the training programme. He incorporated ICT into the design together with enquiry-based activities. The cross-curricular plan brought together language, biology, music, geography, culture and history. He felt that the cross-curriculum training programme made a vital contribution to the Project: "*I would like to state that this phase of the training was achieving MUSE's goals the most*". He went on to explain that this had been achieved by bringing together theory with ICT to enable teachers to reduce their isolation and encourage mutual support and co-operation. It is clear from the extensive analysis he provided in the evaluation (annex 4) for this Unit that he developed the work very carefully and thoughtfully and reflected at each step to find the best way to incorporate the ICT and evaluate student performance. In Cycle B of the training programme Dimitris Zoros involved his students in the Youra Project. He was impressed by the way in which information could be shared between countries using the e-com interface that is based on symbols and images so that language was not a barrier to communication: "*The interface (e-com) is really enhancing and it helps students to combine the tools that are available*". He points out, however, the need for teachers to understand how to use the e-tools: "*The teacher will function as the guide and instructor, so he/she has to be certain about the extent of Youra's possibilities*".

7.3 Spain

During Cycle A of the training programme Manolo Serrano designed and implemented a cross-curriculum project for years 7 and 8 on the flora of the sand dunes and on the local anthropomorphic tombs. This project was observed by one of the evaluators over a two-day visit to the school in February 2004. From the observations and discussions held it was clear that the project had been well-designed and implemented. It brought together a number of different subjects including language, geography, history, mathematics and art and involved students in using a range of ICT including GPS (global positioning system), digital imaging, front page and word. Most importantly students spent a very high percentage of time on task and were enthusiastic about the work. Good analytical feedback from the teacher was provided on the evaluation (annex 4) for this module. He found the module content of great value because it *"focused on taking advantage of the richness provided by the diversity in the multigrade classroom"*. He pointed out, however, that "*.it would be also interesting to publish practical activities which can be used as a resource. They could be a great help for those teachers who do not know how to perform".* In developing his cross-curriculum project he took advantage of mixed-ability grouping and peer tutoring and his goal was for all students to carry out the same activities but with different levels of depth according to their needs and interests. He commented that: "*This module is a content of great value focused on the importance of taking advantage of the richness provided by diversity in multigrade schools*.". This school did not participate in the Youra Project during cycle B of the training programme because the school did not have adequate internet connections, another cross-curriculum project was designed and implemented in its place.

7.4 Synthesis

Data from the observations of teaching and learning in action, perusal of the learning materials developed and interviews with teachers and students have shown that this module was especially highly valued. Even the most experienced project teachers found something useful for their teaching in this module and all teachers expressed the view that this approach was useful and relevant for the multigrade teacher. By the end of the training all teachers had designed and implemented at least two cross-

curriculum projects using ICT. Despite the technical difficulties with the Youra Project the schools that participated in it found it interesting and enjoyable. Providing that the tools are used by all schools at the same time, the Youra Project can help teachers and students to overcome their feelings of isolation and enable students to share information across national and language boundaries.

8 Teacher attitude to the new model of multigrade pedagogy

8.1 Finland

For the experienced teachers many of the ideas in the training programme were not new. They were already using a variety of curriculum strategies and student groupings and developing 'whole school' cross-curricular projects. Furthermore, they were already using an electronic system similar to BSCW called 'Peda.net' to network with teachers in other schools and for students in their schools to network with year other. However, despite their familiarity with much of the training content these teachers had a positive attitude to the 'new' model of multigrade pedagogy finding that it provided a useful theoretical basis for their own good practice. They also commented that *"Tips on setting up a technology corner are good and useful*". For the less experienced teachers in the project schools the training materials provided a much needed theoretical basis for their practice and opportunities to increase their use of ICT with good support from colleagues and the training supervisor. All teachers learned some new ICT applications and were especially positive about the Youra Project. Teachers pointed out the advantages of using ICT to promote inclusive education: "*ICT is one good tool for example for special (needs) children".* Leena Harju found the module on peer tutoring especially useful*: "This way of teaching is my favourite. All organised and new ideas I could take about it. I enjoyed it a lot and I take it as a profit".*

8.2 Greece

In Salakos School the project provided an opportunity for the lead teacher/head teacher, Dimitris Zorros, to reflect on his established practice and try to deliver the curriculum more flexibly through cross-curricular projects using more ICT. He commented that the module on peer tutoring was especially relevant to teachers wanting to innovate: "*I think that the activities can be very useful for those teachers starting to use a less traditional methodology with their pupils in the classroom"*. He was very open and receptive to the new model and from the level of analysis he provided in each of the Unit evaluations (annex 4) it is clear that he had a very positive attitude to the training programme. From the outset he was clearly enthusiastic about using ICT in the classroom seeing its wider benefits*: "..providing a multigrade teacher with the prowess to use ICT can bridge his/her school with the rest of the educational community, nationally or worldwide*". He had already gathered a range of digital learning materials for his students to use. The project enabled him to use ICT more interactively with the students in cross-curricular projects.

8.3 Spain

Manolo Serrano is a very experienced teacher and the head teacher of the school. At the outset of the project he was already very committed to cross-curricular project work as a means of making teaching and learning interesting and relevant for his students. He reported that this module was the one "*which best fits the multigrade teacher's needs since it puts into practice all the content that we have been working on throughout the project period*". He felt it also provided increased opportunities for

interaction and learning between students and between teacher and students and was overall the most valuable approach that could be used to teach multigrade classes. He stressed, however, the need to take for any training programme to take into account a range of theoretical perspectives in developing any new pedagogic model to be delivered across national boundaries. He commented: "*I would have taken account of other theoretical overviews in order to know the way multigrade schools are considered and conceptualised from other different perspectives*". In the evaluation feedback he identified the need for further input on the implications of curriculum adaptation for student evaluation in multigrade classes. He said "*.it is very important to make a deeper study of the curriculum evaluation and its implications in the curriculum reorganisation".*

8.4 Synthesis

Overall, teacher attitudes were positive to the new pedagogic model espoused in the training package. They found the theoretical underpinnings provided by the methodological modules informative and learned some new skills in applying the ICT and cross-curricular modules. The teachers in Finland and Spain, however, were much less positive about their lack of participation in developing the new model. The comments from Manolo Serrano in Spain also illustrate the difficulties involved in developing any 'international' model of good practice that can be applied across countries with different philosophical perspectives on the relationship between teacher and learner.

9 Summative evaluation of the impact of the training programme

9.1 Teacher perspectives

Data from the teacher evaluations of each module (annex 4) provide evidence of a high level of engagement with the training materials and good critical analysis of their usefulness and implementation. The training programme clearly made teachers reflect on their own practice and consider how it might be improved (as well as how the materials might be improved). All teachers reported some positive changes in teaching and learning in their classroom and were supportive of at least some aspects of the new pedagogic model developed. Most teachers found the methodological modules helpful in developing a theoretical framework for their practice although the materials, especially those for Cycle A of the training programme need to include more examples of how teachers can apply the ideas in their teaching. Furthermore, there is a need for different philosophical views to be taken account of and a clear statement to indicate that the ideas presented are not limiting or exhaustive, but indicative and flexible. All teachers developed some new skills in using ICT packages and further developed their skills in designing and implementing cross-curricular projects. The training provided was clearly not exhaustive and further training needs were identified for example in relation to curriculum adaptation and student assessment. The lead teachers involved in the MUSE Project had expected to be able to visit each other's schools and to share their experiences more with the other teachers. Any further programme development should take this on board and seek to facilitate such visits to reduce the professional isolation felt by teachers living and working in remote areas.

9.2 Teacher Educator perspectives

All teacher educators maintained a good level of regular contact with the teachers in the project schools throughout the project period. A record of tutorial support was

kept by teachers (annex 5) for each of the modules taught. This annex provided data on the issues covered during support sessions and action to be taken by the partner school and by the partner institute tutor. These data were supplemented in the case of Finland and Spain with interviews with Juha Paasimäki and Raquel Rodriguez which indicated that these educators had a heavy workload in translating the training materials into their own language for use by the project teachers. They also had to translate the MUSE website into Finnish or Spanish.

The data show that teacher educators provided a high level of support and with very few exceptions teachers reported that they always felt supported by their tutor. Furthermore tutors used their own initiative in responding to the needs of their tutees. For example, Juha Paasimäki developed additional material on ICT because his tutees were already familiar with much of the existing training content. Raquel Rodriguez, worked closely with Manolo Serrano to try to adapt the training materials to the philosophical approach to learning that is used in Spanish schools.

9.3 Evaluator perspectives

The lack of participation of teachers in the development of the new pedagogic model should be addressed in any future programming. This could be achieved by having a longer time-frame for materials development to allow for some action research with teachers and writing workshops for the teacher educators.

The training project was designed to be user-sensitive and throughout the design of the programme and its implementation teachers have made detailed suggestions on how to make improvements to content and structure (see appendix 4). At the end of Cycle A of the training programme the teachers' comments were discussed at the team meeting in Cadiz and this led to some modifications of the programme during Cycle B. Many of the points raised about the training materials were brought up again and explored further at the final team meeting in Athens in September. As the minutes of this meeting show, these points included the need for the teachers in the project schools, with ongoing support from their trainers in the partner institutes:

- to use the software programmes and methodological strategies as often as possible so that they are not forgotten.
- to keep in touch with their trainers and to encourage other teachers to visit the Muse website.
- to disseminate the work of the project through writing articles for local newspapers explaining the aims of the MUSE Project and the results, making a school exhibition with photos and other materials so that their local community will get to know what this project was about
- to provide prototype educational material for their own classes and send these to their partner institution to be shared using the MUSE website platform and tools such as the virtual library of BSCW.
- to promote communication between all parties involved to exchange opinions and find solutions to multigrade problems using the Forum, NetMeeting tools on the MUSE website.

At this stage it is not clear how the training packages will be used in the future. But of two things we are certain.

(1) If the training packages are to be used in the future a vital *first stage* in their use must be their revision in the light of the constructive feedback from the teachers.

They should not be used in their present form. Though much of the present structure and content will remain, the packages will benefit substantially from revision.

(2) The training packages must not be appropriated for use (or sale) by any one partner. The provenance of the training packages must always be attributed collectively to the MUSE team. The inputs of individuals to the training materials (e.g. the substantial work of Michalis Orfanikis) should be acknowledged where appropriate.