





# Report fromWG3 November 23rd 2002

# Mapping the work of Education

## 'Departments' within RESEO

Valerie Tee Peter Tomlinson

University of Leeds

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### Introduction

The task for the members of Working Group Three (WG3) within the RESEO Culture 2000 programme 'Why/how opera education?' was to consider the philosophical aspects of the programme underpinning the work of the other three working groups.

Working Group Three (WG3) decided that before the question 'why?' could be asked, there needed to be a clarification of current practice in education departments, i.e. what do education 'departments' currently do? This research was to be undertaken through a survey of the work of RESEO members. The members of Working Group Three mapped out their own work as a basis for this survey. This work was carried out at the December 2001 RESEO meeting in Porto and formed the basis for the questionnaire. At a meeting in Paris in January 2002 the other working group leaders indicated areas they would like included in the questionnaire. All this work was subsequently refined and put into a questionnaire format. Regular discussions about the work were carried out through the WG3 fortnightly 'chat sessions' on the RESEO Forum. The questionnaire was finally piloted in Ghent in March 2002 and further revisions were made until April 2002, when the final questionnaire was completed by 19 of the 30 current RESEO companies in Budapest. A further 6 opera companies completed the questionnaire independently sending their responses directly to Leeds University. The results of any survey are dependent on the accuracy of the responses to the questionnaire. It was possible for clarification to be sought from members of WG3 in Budapest as the questionnaires were completed but this clarification was not possible for the postal responses. Any evidence of misunderstanding of specific questions has been acknowledged in the report.

As will be seen, the questionnaire has enabled a picture to be created of the opera companies involved in the survey. It also clarified the composition, placing and status of education 'departments' within the opera companies, as well as indicating the practical work of the education 'departments'. Many of the opera companies did not have a designated education department but did have education personnel. The use of education 'departments' in this report includes all educational personnel.

Extensive use of graphs, pie charts and cross-tabulations has been made to create a clear 'picture' of the work being investigated. This has resulted in a very visual report. Not all of the charts will be used in the presentation but they are all included in the full report given here. A cluster analysis was used to gain a more integrated profile across some of the variables.

For members of RESEO there may be a sense of telling one another what you already know and it is part of the aim of surveys to be "merely" factual. But the picture emerging here is not one which individual members could have arrived at unaided. It is hoped that the survey will also clarify the place of education within opera companies for a much wider audience. This will include education 'departments' sharing the work of RESEO with their own opera companies.

### Section 1: An overview of the opera houses within the sample.

The first section of the questionnaire was designed to gain an overview of similarities and differences within the sample of 25 opera companies. 12 countries were represented in the sample: Belgium, England, Finland, France, Germany, Italy, Netherlands, Norway Scotland, Spain, Sweden and Wales.



#### Figure 1 Number of Responding Opera Companies by Country

It can be seen that the sample does not include any opera companies from Eastern Europe. This pie chart also shows the total number of participating opera companies within each country.

23 of the opera companies had their own opera house. Many of the opera houses were also used for ballet and, in one case, other aspects of theatre. As shown in figure 2, Many of the companies had more than one auditorium with some companies using additional spaces such as the foyer for additional performances.



Figure 2 Numbers of Auditoriums across the Sample

The number of seats in each auditorium ranged from 240 seats to 2,336 seats with 12 opera companies having between 1001 and 1500 seats in their main auditorium. Grouping the opera houses in the following figure 3 demonstrates the distribution of the different number of seats in the main auditorium.



Figure 3 Number of Seats in Main Auditorium

The size of each opera company was also reflected in the number of full time employees within each opera company. The smallest company had 5 full time employees (a summer festival opera company) and the largest had 1250 employees. Grouping the companies as in figure 4 demonstrates the distribution:



Figure 4 Number of companies with similar numbers of employees

The specific numbers given for each opera company are shown next in figure 5:



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Figure 5 The number of employees for each company

The questionnaire also explored the number of different operas produced in a typical year for each company. The number of different operas ranged from 2 operas to 25 operas. The most frequent range of different operas produced was between 8 - 10 operas a year. (figure 6)



Figure 6 The Number of Operas Produced in a Typical Year

The number of new productions ranged between 2 and 9 in a typical year.



Figure 7The Number of New Productions in a Typical Year

Looking at a cross tabulation of the total number of operas produced and the number of new productions did not demonstrate a clear relationship (see figure 8) e.g. an opera company producing 15 operas had 8 or 9 new operas, one opera house with 10 productions had 8 new operas but two other opera companies with 10 operas only had 2 new productions. Four opera companies indicated that each of their productions were new productions.



#### Figure 8 Number of New Productions Within the Total Number of Productions

The total number of performances in a typical year ranged from 15 to 328. As Figure 9 below shows, no clear pattern emerged. The largest opera companies, 1001 - 2000 employees, have a similar number of performances to the opera companies with 201 - 400 employees. Two of the smaller opera companies had the highest number of performances.

Employees	1-50	51-100	101-150	151-200	201-250	301-350	Total
1-200	4	2	1		1		8
201-400		2	1	1		1	5
401-600		3	1	1			5
601-800	1		1	2			4
801-1000				1			1
1001-2000				2			2
	5	7	4	7	1	1	25

Figure 9 The Number of Employees against the Total Number of Performances

There were strong trends in the pattern of performing season for most of the opera companies with July and August clearly the quietest months. The festival and touring companies were the companies in action during these summer months.

Month	Percentage
January	76%
February	84%
March	88%
April	84%
May	92%
June	84%
July	40%
August	20%
September	80%
October	96%
November	96%
December	92%

### Figure 10 Opera Season percentages of performances in each month

The question exploring the 'type of season' for each opera company produced data that was unclear, perhaps because of some confusion with the wording of the question. Some respondents ticked all the types of 'season' that applied to their company rather than a 'typical' season whereas others ticked their 'typical' season which was what was requested. This meant that analysis of this data was not possible.

The results for the questions concerning whether opera companies took work placements or whether productions were taken on tour were much clearer. Figure 11 below shows that 75% of the opera houses stated that they took work placements



### work experience placements

Figure 11 Work Placements

75% of the opera companies take productions on tour.



Figure 12 Productions on Tour

An overall picture emerges that is varied and intriguing as very few distinct patterns appear. The majority of the RESEO opera companies have their own opera houses, many with two or more auditoriums. The size of the opera company does not necessarily indicate the output of the company in terms of the number of productions, the number of new productions or even the number of performances in a typical year. The two clear similarities concerned touring and work placements

It was within this widely differing profile that the place of education within the companies was considered.

### Section 2: The composition, placing and status of education 'departments' within the opera company.

The first areas to be explored covered the placing of education within the company, the title given to the education post, the position in the company of the 'line manager' and the number of employees within education.

The titles of education posts were very varied not just because of the role but also because of language differences. WG3 identified four main categories:

- 'Young Public',
- 'Education/pedagogy',
- 'Projects, Community and Education'
- Young audience and Projects'.

Figure 13 demonstrates that 75% of the sample included 'education' within the title of the posts.



Figure 13 Title of 'departments' for education

Figure	14	shows	that	there	was	no	pattern	to	the	titles	designa	ted	for	'education'	across
the diff	fere	nt cou	ntries	•											

	Young Public	Education/ Pedagogy	Projects, Community and Education.	Young audience & projects	
England		1	2	1	4
Belgium		1	2		3
Spain		1			1
Italy	1		1	1	3
Finland	1				1
France		3	1	1	5
Sweden		2			2
Germany		2			2
Norway		1			1
Scotland		1			1
Wales		1			1
Netherlands		1			1
Total	2	14	6	3	25

#### Figure 14 The titles designated for 'education' across the different countries

The range of titles does suggest that education personnel may engage with a public that is not immediately identified as the 'normal' or 'typical' audience for opera i.e. the young. This might reflect opera company aims for these 'departments' i.e. educating and engaging with future audiences.

The question exploring the placing of education personnel within an opera company, brought a range of responses. 58% identified themselves as 'freestanding' within the company but those who were within other 'departments' were within eight different areas: marketing, public relations, dramaturgy, music, cultural services, artistic, third leg(arm) and within a non-mainstage department. Figure 15 gives details of this outcome.



Figure 15 The Placing of Education within the Opera Companies

The cross tabulation in Figure 16 shows the pattern of titles against the placing of education in the opera company.

		Total			
Education in organisation	Young Public	Education/ Pedagogy	Projects, Community and education	Young audience & projects	
Free standing	2	9	3	1	15
Marketing		1			1
Public Relations			1	1	2
Dramaturgy and public relations		2			2
music				1	1
within a non- mainstage department		1			1
Service cultural		1			1
3rd leg			1		1
artistic			1		1
Total	2	14	6	3	25

### Figure 16 Placing of 'education' within an opera company with designated title of post

The designated line manager for the education 'officer' is tabulated in figure 17 below. 65% of education 'departments' were in direct line management to directors - the artistic director, the musical director or the general director. The remainder had a range of line managers including the communication manager, cultural services and chief dramaturgist.

WG3 felt that the education department had a direct link to the top of the company when the line manager was a director. This appeared to be the case and it did not appear to depend on the title of the 'post' or 'department'

	Immediate I	Immediate Line Manager				
Title	Directors	Others	Total			
Young Public	2		2			
Education/Pedagogy	11	2	13			
Projects, Community and Education.	3	2	5			
Young audience & projects	1	1	2			
	17	5	22			

### Figure 17Title for the 'education department' against line management

The number of full time education employees was seen to indicate the size of the education 'department'. Some opera companies did not have any full time education employees, so they are missing from figure 18. All their education employees were part-time.



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Number of full-time education employees

\$

Combining the full-time with the part-time employees demonstrates that the most frequent size of department is 1-5 employees.



fulandpattimeempbyees

Figure 18 Numbers of full and part-time education employees

Putting the number of education employees against the total number of employees in the company demonstrates (figure 20) that it is not necessarily the largest opera companies that have the largest education departments. Indeed, the two largest companies have small education departments



Figure 19 Total education employees against the size of companies

The high number of part-time employees skewed the result for some companies e.g. Scottish Opera had 27 part-time employees. Figure 21 on the next page shows the outcomes for the different companies:

	Full + Part-time Education Employees				
Opera Company	1-5	11-15	16-20	20+	
Glyndebourne	1				
Finnish National Opera	1				
Opera national de Lyon	1				
Vadstena Academy	1				
Welsh National Opera		1			
Opéra de Nancy	1				
English National Opera		1			
Gotebörgs Operan	1				
Junge Opera	1				
Den Norske Opera	1				
Royal Opera		1			
Scottish Opera				1	
Her Muziektheater			1		
Thè_tre du Capitole	1				
Theatre Royal de la Monnaie	1				
Gran Theatre del Liceu	1				
Thè_tre du Chatelet	1				
Teatro Dell'Opera di Roma	1				
Opera National de Paris	1				
Berliner Staatsoper	1				
As. Li.Co		1			
Muziektheater Transparant	1				
De Vlaamse Opera	1				
Opera North	1				
Teatro di Pisa	1				
Total	19	4	1	1	

### Figure 20 Total full and part-time employees for each company

The following graph clarifies the fact that 8 education departments have just one full time employee, with 7 companies having only part-time education employees – their full-time employees therefore being represented here by a 0.



Figure 21 Number of full-time education employees

The way education was managed and funded was the next part of the picture to be uncovered. Education personnel were asked whether their job involved the management of personnel. Figure 23 shows that 80% were involved in the management of personnel.



Figure 22 Management of Personnel

Having a budget specifically designated for education was seen to give some autonomy to education work and Figure 24 shows that 84% had their own budget



Figure 23 Own budget

The source of funding was also explored and as figure 25 below demonstrates, 84% of the education department receive public funding ,with 76% generating some of their own income. Generating income was a task for 13 of the 25 education 'departments'

Money source	Percentage ticked
Public funding	84%
Self-generated income	76%
Sponsors (business)	60%
Trusts and foundations (charity)	40%
Legacies (gifts)	28%
International grants	8%



The work of the education personnel involved collaborations with a wide range of organisations. All were involved in work with mainstream schools. The table below demonstrates the range of other collaborations indicated by at least two departments.

Organisation	
University departments	84%
Music schools/colleges	68%
Theatre/drama groups	56%
Choirs/choruses	52%
After school clubs	48%
Orchestras	40%
Youth orchestras	36%

### Figure 25 Collaborations with other organisations



Figure 26 Membership of Other Organisations beyond RESEO

There were other collaborations through membership of organisations. All the education 'departments' were members of RESEO, but membership of additional organisations was restricted to 14 companies.

Some education 'departments' belonged to several organisations and there were 14 different organisations listed in total. There was evidence that some opera companies collaborate within their countries e.g. the Nordic countries with their 'Network of Nordic Youth Opera' and the UK with their 'UK Opera Education Forum'.

### Section 3: The practical work of the education 'departments'

The data on the practical work of education personnel demonstrated many strong trends across the sample. These similarities included : working with artists, creating workshops, making decisions about audiences and some of the 'additional activities'.

76% of education personnel were involved in decisions about audiences for performances.



Figure 27 Involvement in Decisions about Audiences

68% of education personnel were involved in decisions about audiences for rehearsals.



Figure 28 Involvement in Decisions about Audiences for Rehearsals

The detailed question concerning audiences identified that there were distinctions made between performances in the main auditorium, on the one hand, and specific performances for youth or performances in the second auditorium. 50% of the respondents had some influence on decisions for the main auditorium but there was a nearly 100% response to having an influence on the combined aspects of specific youth programmes, matinee performances and some special programmes. However, not all the respondents were completely specific about whether they were referring to rehearsals or performances. It must be acknowledged that this confusion prevented complete clarity for this area of the survey. A picture emerged of some education personnel having influence on all aspects of performances including ticket pricing, number and placing of seats for 'education', programme selection and performance timing whilst others had no influence at all on the main auditorium but great autonomy on matinees, youth performances, touring performances etc. The work carried out with artists was then explored. The first question considered whether education 'departments' worked with artists from their own company. Figure 30 indicates that 80% do work with the company artists.



Figure 29 Education 'Departments' Working with Company Artists

Working with freelance artists was also explored and 96% stated that they worked with free lance artists



Figure 30 Education 'Departments' Working with Free Lance Artists





Figure 31 Number of Education 'Departments' Training Artists

The training of these artists received fell into the following general categories:

workshop skills, communication skills, classroom management skills, mentoring skills, special educational needs guidance, and opportunities for professional development.

Working Group 4 is carrying out detailed research in this area. The range of artists trained is given in Figure 33 below.

Singers	44%
Instrumentalist	36%
Directors	24%
Repetiteurs	24%
Costume Designers	24%
Writers	20%
Dancers	12%
Conductors	8%
Choreographers	8%
Model makers	4%
Lighting designers	4%
Composers	4%

Figure 32 The Percentages of Artists Trained by Education 'Departments'

The questions concerning workshop activities relate to the work of Working Group 2 and indeed there is an obvious overlap between Working Groups 2, 3 and 4. It was interesting to note how many education departments were engaged in workshop activity. 92% stated that they were involved in creating workshops involving both their own artists and freelance artists. There were consistently more freelance artists trained than artists who were members of the companies, with the exception of the archivists and make up artists.

Table 34 shows that 23 of the 25 opera companies create workshops as part of their work:



Figure 33 Education 'Departments' Involved in Creating Workshops

These workshops were with a wide community and the table below demonstrates those involved (where there was just one response to a category it has not been reported)

Workshop participants or venues	Percentage ticked
Children in schools aged 4 - 11	84%
Students in schools aged 12 - 18	80%
Students in colleges/universities	56%
Teachers	36%
General public	32%
Young people in the community	28%
Youth centres	16%
Hospitals	12%
People with disabilities	12%
Prisons	8%

### Figure 34 Workshop Participants

80% of the education 'departments' were involved in creating productions



Figure 35 Education 'Departments' Involved in Creating Productions

The performers of these new works were professional artists, children, adults in the community, mixed groups and teachers. The table below demonstrates the distribution of this work.

Performers	Percentage ticked
Professional artists	60%
Children	60%
Mixed groups	60%
Adults in the community	32%
Teachers	8%

#### Figure 36 Performers of New Works

88% of the education 'departments' also commissioned work from artists. The table below gives the percentages for the different artists (4% i.e. one response has not been reported)

Artists	Percentage ticked
composers	84%
Librettists/writers	72%
directors	64%
designers	64%
choreographers	52%
singers	12%
Multi media artists	8%

#### Figure 37 Commissioning of Work

The range of other activities carried out by education departments included creating materials, study days, talks and guided tours. The materials created within 'education' were very varied.

Materials	Percentage
Workshop material for teachers	72%
Web pages	68%
Programmes for children	64%
Books/booklets on operas	56%
Opera videos/recordings of productions by participants	52%
Posters	52%
CD/Tape introductions	40%
Workshop material for children	32%
Multi-media applications: CD ROMs etc	32%
Opera history,	8%
Brochure about education department	4%
Visually impaired opera guide	4%

#### Figure 38 Materials created within education

The high percentage for workshop material for teachers reflects a great deal of work being carried out in schools. The web page percentage indicates the use of recent technology by the education departments.

The provision of pre-performance and post-performance talks, study days and guided tours or open house sessions was clearly a part of most education departments' work. The pre-performance talks and study days both had an 84% positive response as indicated I figures 40 and 41:



Figure 39 Provision of Pre-Performance Talks





The guided tours had an 80% positive response and post-performance talks 76% positive response. These consistently high percentages reflect a great similarity across this aspect of 'education' work.

In these sections of the report we have been considering how the opera house education departments (the individual cases) vary in their responses to each of the items and subitems in the questionnaire (the variables). Useful as this survey may be, it may also be important to go beyond such an item-by-item approach and try to build a more integrated picture. This we will attempt to do in the following section.

### **Section 4: Comparing Profiles**

We can begin to build a more integrated picture by considering not just answers to one question at a time, but by profiling responses to a number of items taken together. When we take this approach, describing the variation amongst the individual cases becomes a matter of tracking the similarities and differences amongst such profiles, which equates with seeing to what extent the individual cases fall into groupings with similar profiles.

Doing this is something that becomes very difficult for the unaided human mind as the numbers of individuals and the sets of aspects involved go beyond even quite small numbers: consider, for instance, comparing seven of our opera company education departments with respect to their yes-no answers on a profile of eight specific items from the survey ! Fortunately, however, numerical taxonomists have devised various ways of doing this sort of process in systematic ways that can be programmed into computers and we will therefore make use of one of the main forms of this approach, known as *hierarchical cluster analysis* (cf. Aldenderfer & Blashfield, 1984). This specialised technique is likely to be unfamiliar to most readers, therefore in order to make sense of the findings we shall be reporting, we now offer a minimal outline of what cluster analysis does. For readers who find they want a little more detail, we have also provided a slightly expanded version of this outline in *Appendix A*.

What hierarchical cluster analysis basically does is to start by choosing which variables it will use as the profile and selecting one of the various possible ways of measuring the degree of similarity/dissimilarity between any pair of profiles. Using this measure, the analysis program compares the profiles of all the individual cases with each other. It finds the most similar pair and groups them together as a cluster of two individuals (in our case this would be two education departments). It then generates the joint profile of this cluster, typically by averaging the two individual profiles forming it.

The analysis then goes into another round of comparing all the profiles (ie the remaining individual departments and the new cluster profile), again picking out the most similar pair and then combining these into a further cluster with a joint profile. This cycle is applied repeatedly, until it has joined all the individuals together within clusters at various levels.

This generally leads to groupings/clusters of members with relatively similar profiles within each group, but with these group/cluster profiles being relatively different from each other across the groups. Clear-cut results would indicate that there is a range of "types" of individual cases falling into corresponding groups. However, more "messy" results may usefully indicate the inappropriateness of thinking in terms of such typologies, in that such clear-cut groupings may not actually emerge.

A particular advantage of cluster analysis is that it keeps track of the degree of similarity between any given pair of individual cases or clusters of cases. Thus we tend to see progressive groupings, starting with groupings of the most similar individual cases and clusters, but gradually extending to include clusters/groupings that are no longer very homogenous in absolute terms. That is, we can keep track of the degree of similarity and difference amongst the progressive groupings as they emerge. A more accessible way of portraying the overall map of groupings visually is possible using tree-diagrams, as will be illustrated below.

Having got to this point, cluster analysis then allows us:

(a) to establish and compare the typical profiles of cluster groupings on the particular profile of variables under consideration, and

(b) to compare the clusters with each other with respect to variables *not* already entered into the cluster analysis.

Finally, it must be pointed out that, as is typical of complex forms of analysis, cluster analysis is not a single, completely mechanistic procedure. It does not necessarily yield a single correct set of results which can be accepted as a universal and correct description of the similarities and differences in a given domain. Some degree of human judgment is needed, for instance in selecting ways of measuring similarity. Thus cluster analysis should be seen only as a particularly useful tool to help us become aware of profile similarities and differences in a given domain.

Let us now fill out the above general outline with a specific cluster analyses of aspects of our survey data.

Section 8 of the survey was identified for further consideration by Working Group 3 and is appropriate to consider through cluster analysis. Seventeen aspects of provision by education 'departments' were covered by questions 27 to 29a in this section. We therefore applied hierarchical cluster analysis using the CLUSTAN package (see Appendix A) to the profiles of the 25 opera education departments on these variables.

The cluster analysis output indicates significant statistical differences amongst cluster profiles at the 2-, 3-, 4-and 5-cluster levels, the relevant tree diagram (figure 40 below) suggests that only the 2-cluster solution is worthy of consideration. This is because beyond the 2-cluster level (going towards the left in the diagram), we do not find any long branches indicating a combination of dissimilarity between clusters with homogeneity within them. Rather, individuals and clusters are being combined gradually, indicating varying degrees of similarity amongst them at this level. This suggests that we should focus mainly on the group memberships and profiles at the 2-cluster level.



#### Figure 41 Tree diagram for cluster analysis of Section 8 Profiles (Materials and Activities)

There are a relatively larger number of departments in cluster 1 at the 2-cluster level, ie the upper main cluster in figure 42, than in cluster 2. Some aspects of the analysis suggest that certain departments have profiles which make them difficult to classify, for example Hermusiek. The profiles showing the proportions of these groups giving positive responses on each of the items are presented graphically in figure 43 below. The peaks and troughs for the separate items confirm what has already been seen in previous sections, though it is worth noting the very strong general popularity of pre-performance talks and study sessions, followed closely by guided tours and post performance talks, materials for teachers and Web pages. At the other end of the scale, guided tours for the visually impaired, brochures and opera history material were mentioned very rarely (though it should be added that these were all in the spontaneously provided "other" category).



Figure 42 2 Cluster Profiles for Section 8: Materials and Activities

The relatively similar contours of the two cluster profiles may suggest that the presented materials and activities are prioritised more or less similarly by all institutions and that the differentiation between their two groupings is largely in the range they are able to provide. Generally speaking, cluster 2 institutions provide a narrower range of items, those they do provide being also those which the largest proportions of cluster 1 provide.

A comparison of means indicated that the two sets of profiles shown by the two clusters can be associated with the number of education employees in the departments forming them.

### Section 5: A Summary of the Survey Results

Overall, the picture emerging from this survey is one of substantial variation, in spite of some similarity, amongst opera companies, but a predominance of similarity in the features and functioning of their education departments.

The opera companies ranged in size and country of origin, their similarities included:

- the opera season (for opera companies with their own houses);
- offering work placements;
- taking productions on tour.

During a typical year there was great diversity in:

- the number of productions;
- the number of new operas;
- the total number of performances;
- the number of employees
- the number of auditoriums
- the size of the auditoriums

Variation persisted even for companies of similar size or from the same country or region.

Within this pattern of differences there were striking similarities across the education 'departments'. 80% (or more) of the education 'departments' indicated that they:

- Received public funding
- Managed their own budget
- Managed personnel
- Worked with free lance artists as well as their own opera house artists
- Worked with children and teachers
- Worked collaboratively with Universities
- Created productions
- Commissioned work from artists principally from composers and librettists
- Created workshops principally with school children of all ages

- Created materials principally for teachers
- Presented pre- performance talks
- Created study days
- Organised guided tours around the opera houses

The work with Universities is a clear acknowledgement of the relationship between education 'departments' in opera companies and the world of academia.

Many further questions emerge as the outcomes of the survey are considered. These were debated within WG3 and some of these are listed below: some of these questions will be answered by other working groups!

- Why was so much opera education work within mainstream education?
- Was there a link with funding (public funding)?
- If this is the future audience, is there any evidence that this work does impact on attendance to opera performances in later years?
- Is the school/college focus related to fulfilling a need i.e. there is a paucity of work on opera within the formal education system so the education 'departments' in opera companies need to fill the gap?
- Is rectifying this situation the task of an opera company?
- Why do schools work with opera companies if the work is not relevant to the children's education?
- Is the work in schools or the wider community instigated by the opera companies or by the communities?
- Is the status of the opera company a factor in the work being undertaken i.e. the work is considered 'quality' because of the company
- If the work is carried out by freelance singers/artists not directly related to the opera company, (except through being employed by the education department), what is their relationship to that opera company.
- Is there an artist educator role i.e. a group of artists trained specifically for this work, across opera companies?

Some broader areas emerged for further study

1. Opera education beyond the RESEO sample

The questionnaire responses showed a wider diversity between the opera companies included in the sample than between the education 'departments' within those opera companies. This might not be so in a larger sample including opera companies not involved in RESEO. There is a need to explore opera education in other opera companies in the wider European Community

#### 2. Innovative new works/repertoire

The questionnaire responses indicated that commissioning new works is an activity for the majority of education 'departments'. This raises interesting issues relating this level of innovation to that of the opera repertoire of the opera companies.

### 3. New technologies/marketing-

The use of modern technologies within the education 'departments' was high. The degree of usage would clarify this outcome as a mechanism for communication. The relationship between education and marketing needs to be explored perhaps with reference to the use of new technologies but also areas of particular joint interest e.g. pre-performance talks, study days, guided tours etc

#### 4. The demographic of audiences –

The results were rather unclear concerning issues related to audiences. The responses did not indicate to which auditorium they were referring to or to whether the response was for a performance or a rehearsal (in many cases). This area needs further investigation.

The outcomes of the survey can be seen to relate very closely to the work of other departments in the opera companies as well as to two of the other working groups -WG2 and WG4.

### Section 6: Conclusions

The sample of opera companies within RESEO included a full range of sizes of opera companies some with their own opera houses, some touring or festival companies, and some youth companies. There were many differences between the companies and it was within this context that education departments work. There were many similarities across the education departments despite the differences across the opera companies.

The outreach of much of the work within the education departments was the mainstream education system whether primary schools, secondary education or higher education. There was also a great deal of work in the wider community and this differed from company to company. Some education departments had a specific focus on youth. Having set the context it is now necessary to explore why there is opera education. This is part of the broader question of 'why opera?'

### **Section 7: Appendix A Hierarchical Cluster Analysis**

As a starting point for this slightly more detailed summary of how cluster analysis works, let us take the example referred to in the second paragraph of section 5, the imaginary responses from seven opera house education departments to a profile of eight yes-no items in the survey. They might be as shown in table A1:

Table A1		<b>Opera House Education Departments</b>						
	A	В	C	D	E	F	G	
Question 1	Yes	No	Yes	No	No	Yes	No	
Question 2	Yes	No	Yes	No	No	Yes	No	
Question 3	Yes	No	Yes	No	Yes	No	No	
Question 4	Yes	No	Yes	No	No	Yes	Yes	
Question 5	Yes	No	Yes	No	No	Yes	No	
Question 6	Yes	No	Yes	Yes	No	Yes	Yes	
Question 7	Yes	No	Yes	Yes	Yes	No	Yes	
Question 8	Yes	Yes	No	Yes	No	No	Yes	

Table A1 An imaginary set of responses by 7 Departments to 8 survey items

We can represent these responses numerically by recording "yes" as 1 and "no" as 0, as shown in table A2.

Table A2	<b>Opera House Education Departments</b>						
	А	В	C	D	E	F	G
Question 1	1	0	1	0	0	1	0
Question 2	1	0	1	0	0	1	0
Question 3	1	0	1	0	1	0	0
Question 4	1	0	1	0	0	1	1
Question 5	1	0	1	0	0	1	0
Question 6	1	1	1	1	0	1	1

Question 7	1	0	1	1	1	0	1
Question 8	1	1	0	1	0	0	1

Table A2	The A1	results recoded w	with $ves = 1$ , $no = 0$
		100010010000000000000000000000000000000	, 1011 ) 05 1, 110 0

We now compare the profiles of all the departments with each other for their degrees of similarity/dissimilarity, taking each of the possible pairs in turn. Perhaps the most straightforward way of arriving at matching or similarity scores is by awarding one point for each question in the profile to which a pair of departments give the same answer and zero where they are different (conversely, we could award dissimilarity points where they are different - but here we will tend to use similarity scoring). Doing this, we would find that the highest similarity/matching score is 9 (out of a possible 10) and that this is achieved by two pairs of departments, namely departments A and C, and departments B and D. But notice that although A and C show the same level of similarity to each other as do B and D, these two pairs achieve this level of similarity through different patterns of agreement and disagreement in their profiles.

The next step is to combine (or "fuse") the most similar pair of individual cases into a cluster and generate a new composite profile. In our example, this applies to the two pairs just mentioned, since they share the top similarity scores at this point. We therefore fuse A and C to form a cluster/group we will call AC and similarly, from B and D we form BD. We then generate composite profiles for each of these new clusters, the most obvious way being to average the profiles of the individual cases being combined. This is illustrated in table A3 for the pairs A - C, and B - D:

	А	С	AC	В	D	BD
Question 1	1	1	1	0	0	0
Question 2	1	1	1	0	0	0
Question 3	1	1	1	0	0	0
Question 4	1	1	1	0	0	0
Question 5	1	1	1	0	0	0
Question 6	1	1	1	1	1	1
Question 7	1	1	1	0	1	0.5
Question 8	1	0	0.5	1	1	1

Table A3 Re-profiling of most similar pairs of departments

As shown below in table A4, we then remove the two profile columns for A and C from table 2 and replace them by the new AC cluster profile. Similarly, we replace B and D by profile AD. We now embark on the next cycle of comparing all the profiles we now have, consisting of the remaining individual profiles of departments E, F and G, together with the new composite profiles of clusters AC and BD.

	E	F	G	AC	BD
Question 1	0	1	0	1	0
Question 2	0	1	0	1	0
Question 3	1	0	0	1	0
Question 4	0	1	1	1	0
Question 5	0	1	0	1	0
Question 6	0	1	1	1	1
Question 7	1	0	1	1	0.5
Question 8	0	0	1	0.5	1

 Table A4
 Departments and first cycle clusters of departments

We now find that the most similar pair in terms of matching/ similarity scores are the profiles of department G and of cluster BD. We therefore combine G and BD to form a new 3-department cluster BDG. The composite profile of this new cluster is then derived by averaging as before and another cycle of comparisons is applied. This process of comparison, fusion, re-profiling and replacement is repeated until we have assigned and linked all the individuals and clusters into one large cluster that contains all of them.

This can be conveniently portrayed by means of a tree diagram or *dendrogam*, as shown below in figure A1. In this vertical version, the degree of similarity/dissimilarity between two fused individuals or clusters is indicated by the height of their fusion point, that is, the point at which their branches (or twigs) join. In other words, the vertical axis of the figure measures dissimilarity in upward direction and similarity downwards. That is, the lower the fusion point of two items, the more similar they are, and conversely, the higher the fusion point, the more dissimilar. Thus we see departments A and C and departments B and D fusing at the same low level of dissimilarity - that is, both A and C and B and D are highly similar.

We also see that the next item to be combined in the following comparison cycle is department G, which gets grouped with the existing BD pair to produce cluster BDG, because at this point G and BD had the most similar profiles.



Figure A1 Tree diagram for clustering of imaginary data of table A1

In the next round, department F is clustered with existing pair cluster AC to produce cluster ACF. Following this, E is grouped with BDG. This leaves only two clusters that can be joined (ACF and BDEG), and the level at which their branches are joined is determined by the degree of similarity their profiles show.



Figure A2 Horizontal version of the same tree diagram

One of the advantages of such tree diagrams (figure A2 above portrays the same dendrogam as figure 1, but rotated horizontally because we have used horizontal diagrams in the main report) is that we can readily see how far there appear to be clearcut groupings by examining the lengths of branches and sub-branches. In figures 1 and 2 the suggestion is that there are basically two sets of profiles, in that there are two long main branches. This indicates that there is high dissimilarity (i.e. low similarity) between the two clusters at the bottom of these main branches (because the final fusion point is so far up/along in the dissimilarity direction), whilst at the same time, the fusion points for the various departments (i.e. ACF and BDEG) at the end of the two main branches are relatively low, indicating similarity/homogeneity within these two main clusters.. To the extent that we find this kind of pattern of long branches and groups fusing at the ends of them, we have an indication that in terms of the profiles of responses we have fed into the analysis, there are relatively homogenous groups of cases (here departments) which are at the same time relatively different from each other.

Once we have arrived at this kind of hierarchy of clusters, we can set about deciding which groupings are important. To some extent this is a matter of human judgment, but it can be aided, for instance, by testing for statistical differences between the characteristics of different clusters. In the example shown in figures 1 and 2, the programme actually indicates that only the two cluster division/solution is worth attention, since at the three-cluster level and beyond the clusters do not show significant statistical differences. Sometimes in cluster analysis a number of levels of clustering can turn out to be worthy of consideration.

Once we have decided to consider a given level of cluster partition, then cluster analysis computer programs will typically be useful in helping us investigate the similarities and differences characterising these clusters, not just in relation to the profiles we have entered for clustering, but also by way of other variables we may be interested in.

It should be stressed that the above is an extremely simplified account of the way hierarchical cluster analysis works and that things tend not to be as straightforward as our account might suggest, especially when larger numbers of individuals and variables are involved. In practice, for example, cluster analysis does not tend to use simple similarity/dissimilarity matching scores, but for mathematical reasons utilises more complex measures. Similarly, it is possible to think of a variety of ways of comparing and linking individuals and clusters, and these can affect clustering outcomes. Moreover, whichever sets of approaches one chooses, results may be further influenced by details such as the order in which the programme compares individuals in any given cycle. On the other hand, many of these issues can be explicitly taken into account by cluster analysis computer packages, which is one of the reasons why in this survey we have used the CLUSTAN package developed by Dr David Wishart. More specifically, we have employed the widely favoured Ward's method with squared Euclidian distance as proximity measure.

#### Reference

Aldenderfer, M.S. & Blashfield, R.K. (1984) *Cluster Analysis*. Beverley Hills: SAGE Publications.