

A study funded by DG XXII of the EU Commission

m

ultimedia

e

ducational

s

oftware

o

bservatory

Final Report

Volume I

EUROPEAN OVERVIEW

Revised Synthesis

meso - Final Report 1998 – Volume I – EUROPEAN OVERVIEW
Revised Synthesis Version – November 1998

PROJECT CO-ORDINATOR:

Claudio Dondi

EDITORS:

Stefania Aceto - Adriana Alberti - Simona Fantazzini

EDITING:

Elisabetta De Falco - Simona Feletti

CONTRIBUTION BY:

FIM Psychologie - Universität Erlangen Nürnberg; Guildford Educational Services; Lambrakis Research Foundation; ORAVEP; ORFEUS.



SCIENTER

TABLE OF CONTENTS

EXECUTIVE SUMMARY I

1. INTRODUCTION 1

2. MARKET OVERVIEW 5

 INTRODUCTION 7

2.1 PENETRATION OF TECHNOLOGY 7

2.2 QUANTITATIVE DEVELOPMENT OF SUPPLY 15

2.3 USE OF ICT IN E&T 19

2.4 MARKET MECHANISMS AT WORK 30

2.5 CONCLUSIONS 34

3. POLICIES 37

 INTRODUCTION 39

3.1 EUROPEAN POLICIES 39

3.2 MESO POLICY SURVEY 42

4. SUPPLIERS CATEGORIES 47

 INTRODUCTION 49

4.1 THE “MAJORS” 50

4.2 SMALL AND MEDIUM FIRMS 52

4.3	THE OTHER ACTORS ON THIS MARKET	54
4.4	PROFILES AND COUNTRIES	57
5.	KEY ISSUES FOR MARKET DEVELOPMENT	59
5.1	THE “LIFELONG LEARNER” AS A BUYER OF EDUCATION AND TRAINING MULTIMEDIA.....	61
5.2	INTERNET DEVELOPMENT AND PEDAGOGICAL MULTIMEDIA MARKET	62
5.3	PRICES DYNAMICS.....	69
5.4	PRODUCTION PROCESS	72
5.5	STRATEGIC ALLIANCES, MERGERS AND ACQUISITIONS.....	76
5.6	PUBLIC POLICIES AND MARKET DEVELOPMENT	78
6.	MARKET FORECAST	85
	INTRODUCTION	87
6.1	MESO DELPHI FORECAST SURVEY.....	87
6.2	STRATEGIC WATCH AND OTHER MESO SOURCES.....	90
8.3	CONCLUSIONS	92
7.	CONCLUSIONS.....	93
	MARKET DEVELOPMENT, SUPPLIERS AND TECHNOLOGY	95
	PRACTICES AND POLICIES	102
	APPENDIX 1: METHODOLOGY.....	107
	APPENDIX 2: BIBLIOGRAPHY	121







EXECUTIVE SUMMARY



1. INTRODUCTION

This Report is the final product of the MESO Consortium, produced in the framework of the MESO Project for DG XXII of the European Commission and it represents the conclusion of one year and a half of collective efforts in establishing a permanent observatory on the market, the policies and the general conditions for the development of education and training multimedia products and services. This Final Report is made up of two volumes.

The *first volume* contains the main results of the study we have conducted at a European level:

- ♦ **Chapter 2** presents an overview of the European market development and some elements of comparative analysis, also including comparisons with relevant non-European countries.
- ♦ **Chapter 3** is devoted to public policies and their perceived impact on market development: it mainly contains the results of a DELPHI Policy survey conducted in spring 1998 to collect expert views on policy orientations and possible public intervention.
- ♦ **Chapter 4** provides a classification and a characterisation of suppliers on the market;
- ♦ **Chapter 5** analyses some key issues that resulted of major importance in the analysis that the MESO Consortium made of the collected information and research results.
- ♦ **Chapter 6** provides the results of the Market forecast exercise conducted through the MESO Delphi Survey and compares them with other forecast studies and other MESO results obtained through interviews to representatives of key market actors on the supply side (Strategic Watch).
- ♦ **Chapter 7** contains the 18 main conclusions of the study.
- ♦ **Appendix 1** explains the methodology adopted and the organisation of the project according to the terms of reference.
- ♦ **Appendix 2** contains the bibliography utilised to unite the report.

The *second volume* (Country Monographs) derives directly from the MESO Collection of National Synthesis Reports 1998 and is constituted of the descriptive part of that report: it maintains the initial tables with the synthesis introduction to each country report, with the data collected for each country, the new developments of the last year and the full reports for each country.

1

The MESO consortium has been established, with the co-ordination of SCIENTER, to provide technology, strategic and legal/regulatory/financial watch on the European market of educational multimedia and software. It includes the following organisations: (EDEN, EDU - The Tavistock Institute, FIM-Psychologie, Guildford Educational Services, IDATE, Institut für Informationsökonomie und Neue Medien (IENM), Knowledge Connection Corporation, Lambrakis Research Foundation, ORAVEP, ORFEUS, RAI).

2. MARKET DEVELOPMENT

In order to assess the degree of multimedia market development in education and training at a European level, attention has been focussed on four relevant dimensions:

- ◆ Penetration of technology;
- ◆ Quantitative development of supply;
- ◆ Use of ICT in Education and Training;
- ◆ Market mechanisms at work.



In general terms, Europe still presents a fragmented map in terms on **TECHNOLOGICAL PENETRATION**, though strong signs of convergence are registered in the education and training sectors mainly thanks to a wide range of new national policies aimed at introducing multimedia technologies in lower and secondary schools as well as public offices, and at enlarging the market with special discount rates offered to teachers and students. Public-private initiatives aimed at co-financing along with public efforts the introduction of multimedia tools together with hardware infrastructure are also to be pinpointed.

Differences are mainly registered between northern and southern European countries since the southern European markets are relatively younger, and thus users still show a quite negative attitude towards the use of multimedia tools.

Furthermore, in these countries public policies and private initiatives aimed at fostering the introduction of multimedia tools in the education and training sector have started being efficiently targeted only in the last few years.

By the way, an overall positive growth trend should be pinpointed as far as the ICT infrastructure endowment is concerned. This is surely a first step towards a higher degree of market development, and it should be further supported by national governments, especially with policies aiming at telecommunication market liberalisation in those countries where this process has not occurred yet. As a matter of fact, this would allow greater competition, lower prices and a higher level of technological penetration.

With regard to the second issue, i.e. **QUANTITATIVE DEVELOPMENT OF SUPPLY**, the European supply in multimedia educational products is still limited by a number of factors. Broadly speaking, we can identify four common features that negatively affect the supply side in Europe: a) the market is seldom considered as profitable in the short term and therefore the perceived risks of expanding production are quite high; b) the sales for the home market are mainly based on a low number of titles; c) the supply is sizeable only in four countries (United Kingdom, Germany, France, and to a lesser extent Spain); d) lack of equipment.

In general terms, the quantitative development of supply is high in countries such as France, the UK, the US Canada and Australia; Nordic countries show a medium level of development (relatively high coverage, not many products), whereas countries such as Greece, Portugal and Hungary show a low level of development (low content coverage, not many products).

Countries characterised by a low level of development show high prices and low sales volume, and this is a further obstacle to the development of the market. Because of such difficulties, producers have adopted a number of strategies which have allowed for an increase in the volume of sales. Companies have chosen to focus either on low prices or on high quality, addressing their products to specific categories of buyers. Furthermore, they have undertaken aggressive advertising campaigns and price discounting of new releases so as to widen the number of multimedia consumers.

As for products, the main subjects generally dealt with by publishers are:

- a) games,
- b) education,
- c) reference,
- d) edutainment and
- e) SoHo products (Small office Home office).

There are some variations across Europe in the type of products which boost the electronic publishing sector. Southern European users, besides producing a limited number of products compared to the rest of Europe, tend to prefer games and reference tools. In Italy, for example, games amount to 46% of the global market; reference products to 24% of the market whereas education only amounts to a 7%. On the contrary, the main product sold in Belgium is education or training software.

The quality of multimedia products has improved substantially in the last two years, moving away from an unsatisfactory level which had induced negative attitudes among users and intermediaries (teachers, training managers). What has not yet improved is the distribution of multimedia products.

There are still many problems in devising satisfactory channels of distribution. For example educational programmes are generally placed in the category of edutainment products which does not promote their sale. In order to solve such inefficiencies more and more publishers are undertaking special agreements with distributors.

Table 1: Suppliers profile by country

	Denmark	France	Germany	Greece	Italy	Spain	The United Kingdom
European media groups		Yes	Yes	No	Yes		Yes
Book publishers	Widely involved	Widely involved	Widely involved	Minimal activity	Widely involved	Widely involved	Widely involved
Small and medium multimedia publishers	Low number (strong concentration)	High number	High number	Low number	Medium number	Medium number	High number
Production for specific customers	High	High	High	Minimal activity	High	High	High
Multimedia consultants		This activity is often linked with the specific production.	This Activity is often linked with the specific production.	No relevant	Low presence	Low but relevant	A few could have a major impact.
Television	2 channels are widely involved	Educational TV is involved weakly		Minimal activity and prospects	RAI Educational active, but unstable strategic orientation	Educational TV in re-launch phase	The BBC is involved and some other broadcasting are involved in a minor way.
Training bodies	Low	Medium.	Low	Very low	Their production is important but is not commercialised.	Medium	Few of them produce few titles. Some linked to big groups.
ODL organisations	Very low	Very low	Low	Minimal	Very low	Rather low	Low
Universities	Very low (own use)	Low (Internet & own use)	Low	Very low (Internet & own use)	ODL Consortium NETUNO and local initiatives	Starting	Low (own use)
Associations or consortia		Several teachers associations have a thematic production.	Yes	Minimal to none	Minimal	Minimal	2 Colleges consortia and an independent university consortium

With reference to the **USE OF ICT IN E&T**, the **education sector** has not been viewed until now as a very profitable one and has been generally considered as being too difficult to enter. The lack of adequate financial support is one of the most serious obstacles in entering this sector. Yet, especially in France, Spain, Italy and the United Kingdom new avenues seem to be opening as a number of recent national policies have set emphasis on the introduction of programmes for educational multimedia. Thus, the education sector is undergoing significant changes, and perceptions on its potential expansion are becoming increasingly positive.

As for the **training sector**, training and re-training programmes for employers and employees have become increasingly important in the European corporate sector. Companies are placing great emphasis on multimedia training since they present two significant advantages: they allow to save resources on traditional training and they allow a quick adaptation of skills to the market changing needs. At present, corporate training is most needed in technical IT skills and this means that there is great potential for multimedia training and education. The latter is viewed as having the ability to deliver high-quality, highly focused and detailed training and education materials across a wide geographical area (Datamonitor, 19, 1997). The leading industries are banking, retail and petro-chemical, where large organisations have a major weight but several developments are taking place in smaller enterprises, through the implication of intermediaries (Association, Chambers of Commerce, etc.) in the training provision and funding system. Training and re-training programmes are experiencing a growing demand all over Europe, especially in Northern European countries. In the United Kingdom, for example, training providers are increasingly involved in government-launched programmes precisely because life long learning has become a major national priority.

With regard to the **home sector**, it has boosted the market development of educational CD-ROMs and on-line services in many European countries, especially in those with a high degree of technological penetration. Countries with a more developed Internet infrastructure and lower access costs have shown a greater demand for Web-based services, although compared to off-line products these have experienced a much lower demand. It should be noted that the consumer market is the largest user segment of multimedia since the majority of PCs are sold to home users.

Within the range of products supplied by the market, games and entertainment are among the most requested items whereas education and edutainment CD-ROMs have not yet reached the same size of demand. There are, however, significant variations among European countries. There is, in fact, a higher demand for such products in France, Germany and Scandinavia than in southern European countries. Yet in the long run the demand for multimedia products should become more homogeneous across Europe as the less developed regions increase their level of technological penetration.

It is a fact that the demand for hardware and software is rapidly increasing in southern European countries and that a growth in home PC penetration will foster the growth of the home market for multimedia in training and education.

In general terms, we can identify three factors that have contributed to the increasing demand for educational multimedia products: a) higher quality of products; b) declining costs of multimedia hardware and software; c) government initiatives promoting the use of multimedia and technology within schools. This has indirectly affected the demand of the home sector as parents tend to buy the same computers for home use as those used by their children at school. Moreover, children themselves become more interested in multimedia products wanting to explore at home the many opportunities offered by this sector.

In short and according to the data collected, there is substantial optimism concerning the growth of multimedia products and services for education in Europe. As a matter of fact, the total expenditure in this sector is expected to grow due to declining prices and/or higher quality products. Nevertheless, the CD-ROM market will continue to hold the largest share of the home education sector.

In fact, although the number of Internet users is expected to grow at a faster rate than the CD-ROM users, off-line products will continue to hold a greater share of the home education market. This is due to lower prices, greater accessibility and availability. The demand for on-line services may be affected by high costs also due to telecom pricing and supply conditions. With the full liberalisation of telecommunications in some southern European countries and with a fall in prices, the demand for such services will certainly experience a relative increase.

MARKET MECHANISMS AT WORK have also been considered in order to assess the qualitative degree of market development on the basis of four indicators: a) availability of information on supply; b) established reference market prices; c) developed import-export activities and d) consolidated distribution channels.

Easy availability of information on supply is particularly consolidated in countries like France and the UK and, to a lesser extent, Germany, but on the overall Europe does not show a satisfactory level of development, since the remaining countries (especially southern European ones) do not show an established network of information sources.

As for **reference market prices**, an incipient market maturity is shown by the UK, France and some nordic countries such as Denmark, where reference price plans classified by typology of products are emerging. Prices for multimedia products are generally diminishing in southern European countries due to a higher degree of market liberalisation, to the increase in the number of competitors and to a higher level of professionalism among providers.

The observed generalised trend towards a reduction of prices makes the possibility of moving from a low volume/high price to a high volume/low price situation more plausible, especially in the United Kingdom, which could pave the way for the development of similar trends in the rest of Europe.

In **import-export activities** Europe continues to run a trade deficit in IT and telecommunication products. In the overall, European countries still have great problems in competing with non EU countries such as the US, Canada and Australia, with the exception of the United Kingdom, France and Spain which export their products to countries of their language area by-passing the linguistic and cultural adaptation problem.

Distribution channels vary according to the market publishers are addressing to: either direct sales or mail order when dealing with large companies or SMEs, bookstores and software- or hyper-markets when addressing to the home market and distributors or bookstores for the distribution of educational products. Especially in this sector an unsatisfactory organisation of distribution is claimed by publishers who therefore prefer to use their own distribution networks.

3 EUROPEAN POLICIES

The development and introduction of multimedia products for education has become a major concern for most European governments, especially in the last few years. Yet, the degree of development of such products and the market dynamics significantly vary across Europe.

In general terms, northern European countries (in particular, Denmark, Sweden and the UK) seem to have achieved greater results in this field than most southern European countries have (though some significant regional variations, such as for example the case of Catalonia in Spain, do exist). These differences may be explained in part by the fact that southern European countries have started launching national programs for ICT integration in the education sector only recently and in part by the lower degree of technology penetration in such markets.

The main difficulties these countries have encountered in fostering the introduction of multimedia technologies in the public sector, including schools, may be attributed to deficiencies in the implementation process. An insufficient level of funding and loosely co-ordinated programs may be accounted for the low success of national policies in the educational field. This is especially true of past national initiatives, whereas in recent years more articulated and integrated programs (equipment and training) seem to engender higher expectations. Perhaps one of the most striking differences between southern and northern European national programs for education concerns the type of approach adopted. Whereas the former tend to have a top-down approach, the latter have developed to a large extent bottom-up oriented approaches.

Such differences are determined, in part, by diverse national policy orientations but, in part, also by different structural needs. In countries where the use of new technologies in education is not widespread at a local level, the intervention of the state «from above» may represent a significant driving force in fostering multimedia educational programmes. In this respect, France has been induced to adopt a top-down strategy which, although quite important in boosting this sector, has not always produced the expected results.

In this respect, three main trends may be identified within the European Union. A first group of countries (among which Denmark, Germany) gives priority to policies that enable an adequate integration of technology within education and training; a second one to Life Long Learning programs (such as for example in the United Kingdom) and a third one (which includes Italy and Spain) which adopts an instrumental approach, looking at the introduction of multimedia in education and training as an opportunity to reorganise and modernise their educational systems.

A fourth trend may also be identified, but it is not exclusively peculiar to Europe (as it also includes Australia and to a certain extent the US): in many northern European countries there is a tendency to adopt policies which enhance equal access of all citizens to multimedia technologies for education.

Although generally mainstream policies are quite different across Europe, the initiatives of the European Union in this field have greatly contributed to developing and fostering a common awareness of the importance of multimedia in training and education. In particular, the pilot projects set up by the Commission in different European countries have become an important driving force in the overall national developments, especially in those countries which had not yet developed sufficient experience in this field. Building an integrated information society has become one of the EU top priorities.

Table 3: Public Policies/Present Stimulus

COUNTRY	Denmark	France	Germany	Greece	Ireland	Italy	Norway	Portugal	Spain	Sweden	United Kingdom	Hungary	Australia	Canada	USA
High															
Medium/High															
Medium															
Medium/Low															
Low															

EXTRA EU

Source: SCIENTER Bologna • Eden Budapest • Edru-Tavistock London • Fim Erlangen • Guildford Education Services • Idate Montpellier • Knowledge Connection Toronto • Lambrakis Research Foundation Athens • Oravep Paris • Orfeus Aarhus • Ienm Salzburg • Rai Rome 1997

4. SYNTHESIS OF MARKET DEVELOPMENT FACTORS

Table 4: Synthesis of market development factors

	Penetration of technology	Quantitative development of supply	Use of ICT in E & T	Market mechanisms at work (info, prices, etc.)	Overall
Australia	High	High	High	Yes	H
Canada	High	High	Medium/High	Yes	H
Denmark	High	Low	High	Yes	H
France	Medium/High	High	Medium	Yes	M → H
Germany	Medium/High	High	Low/Medium	Yes	M → H
Greece	Low	Very Low	Low	No	L → M
Hungary	Low	Very Low	Low	No	L → M
Ireland	Medium/High	Medium/High	High	Yes	M → H
Italy	Medium	Medium	Low	Yes (starting)	M
Japan	Low	Medium	Low	n.a.	L → M
Norway	High	High	High	Yes	H
Portugal	Low	Very Low	Low	No	L → M
Spain	Medium/Low	Medium/High	Low	Yes (starting)	M
Sweden	High	High	High	Yes	H
United Kingdom	High	High	High	Yes	H
USA	High	High	High	Yes	H

Source: MESO Report 1998

5. CONCLUSIONS

From all the activities we have conducted within the MESO project, the following seem to be the main conclusions.

MARKET DEVELOPMENT, SUPPLIERS AND TECHNOLOGY

A differentiated continent with some convergence among countries

Europe is not a homogeneous continent as far as the use of ICT in education and training is concerned and, as a whole, is not so advanced as other leading countries such as the USA, Canada and Australia. Differences among European countries are still macroscopic, but both compensating differentials in market growth and a significant convergence of national public policies (at least in the education sector) may induce to believe that distances between the most advanced (UK and Northern Europe) and the less advanced (Southern Europe) countries in this area are going to be reduced in the next years. This is not, however, an uncontroversial conclusion because the signs of stronger growth in technology penetration in Southern Europe might not be accompanied by corresponding growth in use and good practice.

Growth in quantity and quality of products and services

A substantial progress in quantity and quality of supply of multimedia products and services for education and training has taken place in the last two-three years. The explosion of Internet use (in organisations and at home) and the significant growth of CD-ROM market (especially at home) are the two basic conditions, on the technology infrastructure side, that support the market growth.

New categories of actors are increasing their presence in the education and training business thanks to the increase of the product component into what was mainly (and still, to a large extent, is) a service market.

The quality of multimedia products has improved substantially in the last two years, moving from what was not a satisfactory level, which justified negative attitudes developed in the past by users and intermediaries (teachers, training managers, etc.). New forms of user-based quality review are emerging in some countries and are a sign of incipient market maturity.

Trend towards price decrease, however not generalised

The multimedia E&T market seems to be moving from a situation characterised by high prices and low volume of production to a situation characterised by lower prices and higher volume of production. Within this process “quality” becomes a key-issue: once multimedia products and services become widely used, the risks brought about by mass production become higher. A risk of possible reduction of quality when the market size increases is perceived by several observers (suppliers and policy makers), but higher volume of production does not necessarily mean lower quality. A re-engineering of the production process in view of a more industrialised approach may lead to the adoption of more mature quality approaches that may accompany lower production cost and lower prices.

It is to be noted, however, that the tendency towards price reduction is not generalised: if it can be observed rather easily in the home segment, the situation is more multi-faceted in the education and training sectors, where institutional presence and different degrees of integration of service and product components, and an evolution of the licence sales practice may bring to very different results in terms of prices.

A multi-domestic market with limited but growing transfer of products across countries

It cannot be said that a real European market exists, but rather a multi-domestic market, in which the national dimension is by far prevailing (with the heavy consequences that this may have on suppliers of smaller countries), but some level of import/export/international collaboration is taking place, especially in some specialised or high qualification areas.

The multimedia educational market continues to be a national one, but the number of transnational partnerships and licence agreements is starting to grow rather quickly, that was not the case in the previous years. This dynamic will not generate a European market in the near future, but it shows that providers are increasingly inclined to move into the international market in order to overcome the limits of a small national audience. Many of the export developments, however, are directed out of the European Union, especially for those producers based in countries that can count on a significant language and cultural area outside European Union.

A rather fragmented supply, with new trends towards concentration

In the majority of European countries, the educational multimedia market is composed of many small structures operating alongside to some big players, among which the subsidiaries of large publishers, telecom companies and software companies play an important role.

In the last years, however, the “big players” have shown an increased interest for the education and training market and often have modified their approach: from the creation of small specialised subsidiaries they are moving towards the acquisition of successful smaller companies that are rooted in the sector of MM for training and education and operate at a national level.

This new approach seems to be more appropriate because it combines financial strength with existing expertise in a way that was not common in the past. It is also a possible path towards the internationalisation of the E&T multimedia market.

Growing technology penetration

In the latest years a high growth has been observed in the diffusion of ICT in all European countries, and the trend is expected to continue vigorously, especially in those country that used to be relatively less advanced.

Education and training usages are responsible for about one third of the multimedia development. One factor that results from both MESO and other studies is that quick advance in the home market is generating pressure on the education and (to a lesser extent) training segments as well.

On the other side of the relationship, even slow progress of multimedia in the education system is generating significant results on the consumers' market, by supporting general favourable attitudes in families towards the use of multimedia for learning purposes.

Another aspect should not be underestimated: the growing diffusion of ICT is involving a growing proportion of European population, but not all of it. The risks of new forms of social exclusion have been considered in many theoretical papers, but the concrete results of MESO and the other studies analysed to write this report show that this risk is a serious one and that measures are required not only to provide learning access opportunities to the less favoured through ICT – based learning centres, but also to generate awareness and motivation to use access opportunities by the same audience.

CD-ROM and Internet/Intranet leading the E&T Multimedia Market

CD-ROM represents by far the largest part of the E&T multimedia market, whilst Internet/Intranet applications are growing more quickly, but starting from a much more reduced base, at least in economic terms.

Broadcasting and videoconference are still modest in economic terms, but growth is expected in some market segments (university networks, corporate training, etc.). Integration of technological platform is considered to be the natural trend of the present and coming years. The MESO survey conducted on multimedia suppliers confirms that globally the platforms which are considered as relevant are the CD-ROM and Internet.

The installed base equipped with CD-ROM drives is considered as sufficient in order to attain a mass market in a year, which will not be possible for the DVD before several years. The whole of publishers have strategies implementing Internet but following different scenarios.

For certain of them the two platforms are perceived and developed following their complementarity but we notice that the number of hybrid products is still low. Other publishers consider Internet to be an extension of the production via a new distribution channel, the pedagogical multimedia are for them more a question of scripting training modules than a choice of technical platform.

The last publishers category is leaving progressively the CD-ROM for Internet and reckon on an evolution of the publisher's profession towards the one of training offered implementing tools and services on Intranet.

If the first market segment targeted is principally the corporate one, these providers do not exclude the possibility of developing, in a near future, of such offers for more institutional markets like, for instance, colleges at the a regional level.

Growing importance of industrial products compared to amateurial products

The DELPHI forecast study conducted within MESO predicts a growth in the market share of industrial multimedia products for the open market and a corresponding reduction of the share of "amateurial" products developed by groups of teachers and/or very small specialised organisations.

The decrease, nevertheless, should not affect the bespoke products developed for large user organisations by highly professional consultants and training bodies. It should be noted, however, that standardisation of products and customisation of training solutions are not reciprocally inconsistent: open learning approaches developed in the '80s have already proved that "industrialisation" in the production of modular learning materials may be supportive of affordable access to individualised learning paths.

A related estimation concerns expected market shares of different categories of suppliers: major companies are expected to increase their presence in the market, smaller companies to decrease; institutional and semi-institutional providers (universities, institutional publishers, associations) are expected to decrease their presence, with a relatively minor decrease for training bodies, which have a stronger position in their niche market, very sensitive to the specialised service component.

Tendential convergence of production processes

In parallel with the well known convergence of technologies, a starting convergence of production processes can be recognised, again mainly through the new visibility of supply options that Internet is making possible: professional electronic publishing for the open market, professional and tailor-made product and system design for large customers and “amateur” production by groups of teachers used to be separate ways of development of multimedia products for education and training, each one with its strengths and weaknesses.

In the last two-three years the actors implementing these modes of production are starting to establish some forms of collaboration (publishers with organised groups of teachers rather than individual authors, training consultancies with publishers, large organisations buying external licences for basic products from publishers).

This trend may well modify the relative positions of suppliers categories as forecast in the previous point: small companies and institutional actors may well develop strategic alliance orientations that will allow them to reach or maintain leading positions in the supply chain, especially if they are able to build on their higher specialisation and familiarity with specific market segments.

Links between categories of suppliers and market segments

Categories of suppliers tend to focus and specialise on certain demand areas/segments, but the opposite is not equally demonstrable: users are open to consider a broad range of supply options and distribution modes.

For example, large organisations which used to order or produce their specific training products are now tendentially shifting towards the use of off-the-shelves or network-available learning products (which have improved their quality and do not require massive up-front investment).

A broader awareness is developing, in the education and in the training segments, about the need to integrate the use of ICT in a relevant, context-based way. The “why” and the “how” to use technologies in the learning process are replacing the “if”: the question is no longer to decide if ICT have some use in education and

training.

Educational and training institutions, training departments of industry and public administrations are finding their own path to an integrated use of ICT within the learning process, in coherence with their own problematics and strategic orientation.

In a word, if in the consumer market multimedia education can be proposed in the format of a product, in the education and training segments it is just a component to be integrated in a service provision framework.

The service component will still be dominant in the education and training market

Service will keep on playing a key-role in the educational and training market, and therefore companies already offering training and educational services beside their software production will surely be more competitive in the multimedia market. This explains much of the observed tendency towards vertical integration of the present phase of mergers and acquisitions.

Copyright problems

This is today one of the major problems to the multimedia industry. As well as the fact that some companies are using "in all good faith" images, animations or sounds for which they do not have the rights, the pirating of products by consumers is even more important. It was believed, for example, that the development of CD-ROM would limit this phenomenon but it has not because the price of recording equipment (CD-ROM engravers) is more and more affordable.

PRACTICES AND POLICIES

On line platforms are better accepted than off-line solutions in institutional education and training

On-line has succeeded where off-line had not really achieved satisfactory results: convincing the teacher and trainers communities that ICT makes sense in the institutional education and training environment.

Also learners usually find on-line based learning systems more approaching than off-line solutions because they appreciate the communication with other (remote) learners and the exchange of experience.

As a whole, the broad acceptance of on-line platforms in the education and training segments will most probably lead to a generalised change in learning

practices in the next years to come.

Public policies in almost all European countries are also pushing towards this direction by providing telecommunications facilities to schools together with multimedia computers and by training teachers to use communication technology for learning purposes.

Increased autonomy of learners and evolution in purchase decision making processes

The recent stream of policies to support the lifelong learning idea and practice, the accent posed in all recent pedagogical approaches on autonomy of learner, the objective increase of age and educational level of the average learner are all challenging forces to the usual assumption that in most cases the decision to buy education and training products is not taken by the learners (the final user), but by a “prescriptor” (a teacher, an educational authority, the head of a training department, etc.).

In addition to this, in most European countries the real growth in the Multimedia Education market has come from the Home segment rather than the institutional education and the corporate training segments. There the young or adult learner is a consumer, with his own criteria for choice and his own sensitivity to price, product and service components, etc..

So, even though almost all suppliers and experts consulted by MESO agree that “institutional intermediaries” between suppliers and learners will have an important role for many years to come, the trend towards a more autonomous learner is observable and the North-American market tells us a lot on the tendential “disintermediation” of education and training provision.

An effort to understand the education and training multimedia market cannot forget to pay attention to this trend and to investigate learners’ criteria and behaviour when choosing a learning product.

Failure to do so may lead, in the medium term perspective, to a failure of institutional education and training systems to adapt their provision to the user requirements and to a progressive marginalisation to those areas in which a formal title or qualification is the only motivation to undertake a learning programme.

Perceived role of public policies

The role of public policies is still seen as a fundamental driving force for market development not only in terms of funding.

Great expectations exist on the impact of public measures that are now in preparation or in the early phase of implementation.

Public funding, legislation to recognise ODL and multimedia as legitimate ways to organise education and training, specific incentives to apply telematics in education and training are supporting market growth not only because of the material impact of public funds, but also for the confidence climate that they may generate in the suppliers' and users' minds.

Actually it seems that public authorities in the main European countries have understood the stakes of educational multimedia, and the number of initiatives, local, national and European are starting to multiply. They are taking shape by the setting up of financial support funds, and incentives to develop infrastructures, programmes and lower the cost of equipment for schools.

European convergence in policy making

A potentially significant new fact is the emergence of multi-country projects directly supported by many national Ministries of Education which have among their objectives to involve private partnership in a systematic way. The generation of policy convergence in European countries on this issue should be viewed as a possible major factor of market development for the years to come.

Up to now, in fact, European policies have been recognised as successful in changing the attitudes towards Open Distance Learning and ICT, but a new generation of measures is required to stimulate bottom-up initiative from education and training environments (e.g. Netd@ys, but also incentives to users categories) as well as support to co-ordination among national authorities (e.g. EUN).

Public-private partnership

The DELPHI policy survey conducted within MESO allows to detect a very favourable attitude among experts towards public-private initiatives in the field of multimedia E&T. These are in fact multiplying, but according to national or sectoral differentiated models.

The ideas of a European Foundation for Educational MM (as a European level example of public-private partnership) were also proposed to the DELPHI panel, which identified the following as most relevant tasks: support for transnational mobility of learning programmes and products; strategic advice to the EU Commission, national government and industry; information provision for users; observatory on market trends; brokerage to bring together suppliers of capital and those needing it; help desk for those small-scale projects which intend to grow, but do not have the necessary marketing/dissemination expertise to cope with the market; implementation of a system of "licence mixte" for particular subjects.

Quite relevant tasks, though less quoted than the above mentioned, are the following: the definition of standards for the multimedia industry and the provision of venture capital.

Generally speaking, the idea of establishing a European Foundation for multimedia education (and its proposed tasks) has received very favourable comments.

De-institutionalisation and European strategic interest

Spontaneous market development has been stronger in the segments of home learners and large organisations in the last two years: this leaves a modest role, in market development and service provision, to the institutional education and training systems.

Since the objective of innovating these systems is still a priority in the agenda of European policy makers, public initiative is currently trying to involve schools, universities, institutional training systems into the mainstream of multimedia educational products and service development.

What seems to be important is not to keep institutional education and training systems isolated to preserve their aims, but rather to influence market development in such a way that learning concerns prevail on technology-led developments, in a context of well balanced partnership.

An additional advantage of such an approach is to shift the focus of the problem from "the multimedia product" to "the learning-related service incorporating multimedia product". On the latter ground European actors are not, by definition, weaker than their global competitors, and the capacity to grasp users' needs and to interact with them may well compensate for lower investment capacity of media groups. In order to implement such orientation, new partnerships have to be established, in which education and training concerns are combined with those of industrial policy.

Education and training bodies cannot be seen only as "users" and "content providers", but rather, in a federative effort, as "masters of the game" of E&T service provision. This does not mean to give a marginal role to industrial actors, but rather to build on the strengths of European education and training institutions to develop a coherent industrial approach within this sector, that is and will continue to be one in which the dimension of public service - although partially operated by private entities - is extremely relevant.

That is why any possible major partnership between public and private actors at the European level should keep innovation of E&T as its key focus: strategically oriented and innovative E&T bodies are the best condition for the multimedia market development in absolute value and in qualitative aspects. Among other impacts, it would reduce the presently high risk of failure in industrial investment.





/

1. INTRODUCTION



This Report is the final product of the MESO Consortium, produced in the framework of the MESO Project for DG XXII of the European Commission and it represents the conclusion of one year and a half of collective efforts in establishing a permanent observatory on the market, the policies and the general conditions for the development of education and training multimedia products and services. This Final Report is made up of two volumes.

The *first volume* contains the main results of the study we have conducted at a European level:

- ♦ **Chapter 2** presents an overview of the European market development and some elements of comparative analysis, also including comparisons with relevant non-European countries.
- ♦ **Chapter 3** is devoted to public policies and their perceived impact on market development: it mainly contains the results of a DELPHI Policy survey conducted in spring 1998 to collect expert views on policy orientations and possible public intervention.
- ♦ **Chapter 4** provides a classification and a characterisation of suppliers on the market;
- ♦ **Chapter 5** analyses some key issues that resulted of major importance in the analysis that the MESO Consortium made of the collected information and research results.
- ♦ **Chapter 6** provides the results of the Market forecast exercise conducted through the MESO Delphi Survey and compares them with other forecast studies and other MESO results obtained through interviews to representatives of key market actors on the supply side (Strategic Watch).
- ♦ **Chapter 7** contains the 18 main conclusions of the study.
- ♦ **Appendix 1** explains the methodology adopted and the organisation of the project according to the terms of reference.
- ♦ **Appendix 2** contains the bibliography utilised to write the report.

The *second volume* (Country Monographs) derives directly from the MESO Collection of National Synthesis Reports 1998 and is constituted of the descriptive part of that report: it maintains the initial tables with the synthesis introduction to each country report, with the data collected for each country, the new developments of the last year and the full reports for each country.

¹ The MESO consortium has been established, with the co-ordination of SCIENTER, to provide technology, strategic and legal/regulatory/financial watch on the European market of educational multimedia and software. It includes the following organisations: (EDEN, EDU - The Tavistock Institute, FIM-Psychologie, Guildford Educational Services, IDATE, Institut für Informationsökonomie und Neue Medie (IENM), Knowledge Connection Corporation, Lambrakis Research Foundation, ORAVEP, ORFEUS, RAI).





2. MARKET OVERVIEW



INTRODUCTION

This section intends to provide a general overview of the development of the market of multimedia technologies in education and training at a European level. In order to contrast and compare European trends in this sector, attention will be focussed on four relevant dimensions:

- ♦ Penetration of technology;
- ♦ Quantitative development of supply;
- ♦ Use of ICT in Education and Training (E&T);
- ♦ Market mechanisms at work.

It is our view that only when each of these aspects is clarified conclusions can be drawn on market development, so this chapter structure is reflecting the following logical scheme.



2.1 PENETRATION OF TECHNOLOGY

Europe presents a fragmented map in terms of technology penetration in general (not specifically in education and training). The diffusion of technology is certainly higher in northern European countries than in southern ones. Sweden, the United Kingdom, Denmark and Norway show a high degree of technological penetration, whereas Portugal, Greece, and to a lesser extent Italy and Spain still have a long way to go in order to reach a high level of technological penetration. France and Germany seem to be somewhat in between these two positions.

Some improvements have been made in European countries thanks to a wide range of new national policies aimed at introducing multimedia technologies in lower and secondary schools as well as public offices.

Of great relevance in this respect are the initiatives of many private firms – especially in the United Kingdom – to co-finance along with public efforts the introduction of multimedia equipment and of educational programs in lower and secondary schools. Special discount rates are also offered to teachers and students with a view to enlarging the market.

Several factors are responsible for the observed differences in Europe. In particular CEE and southern European countries seem to be less developed in this respect as: a) their markets are relatively younger b) there is a relatively negative attitude among potential users (low demand in France, Germany, Spain, Greece); c) private initiatives have not been so strong in promoting the diffusion and use of new technologies; d) public policies in this field are relatively young and have not always produced the expected results. A further inhibiting factor, which is related to users' attitudes, is the low level of investment in this sector.

In general terms, northern European countries seem to be more capable than southern ones in promoting familiarity with new technologies in the households. The measures taken are various: education, access to public institutions (libraries and museums) and continuous provision of the best-of-the-art ICT infrastructure.

Another relevant factor that accounts for a higher or lower degree of IT penetration is national average income levels.

The following table shows the relationship between per capita GDP, IT penetration and IT expenditure.

Table 1: Relationship between GDP and technological penetration in the home and education sector

	Per capita GDP (ECU) 1997	IT per capita expenditure (ECU) 1997	IT%GDP 1997	ICT per capita expenditure (ECU) 1997	ICT%GDP 1997	Number of PCs per 100 population 1997	Telecom equipment market value (MECU) 1997	Mobile subscribers/inhabitants (%) 1996	Internet on line users (%) 1998	Cable TV subscribers/HH (%) 1996
Austria	23,417	477	2.08	931	4.07	16	582	7.42	5.5	28.2
Belgium/Lux	21,787	511	2.39	1,026	4.80	15	600	4.71	6.4	88.5
Denmark	27,415	819	2.98	1,482	5.39	33	493	26.52	16	41.0
France	21,716	538	2.52	1,013	4.75	16	4,974	4.29	6.0	10.2
Germany	23,708	511	2.15	1,029	4.33	19	8,045	6.70	8.7	47.5
Greece	9,640	85	0.88	396	4.11	12	403	4.89	1.0	0.1
Ireland	16,108	321	2.08	920	5.96	15	328	7.38	11.0	49.0
Italy	17,430	264	1.46	698	3.85	9	3,881	11.21	4.1	0.1
Netherlands	21,047	601	2.94	1,177	5.76	26	1,373	6.50	8.3	91.5
Norway	29,716	760	2.66	1,427	4.99	32	511	28.66	13.6	39.4
Portugal	8,600	130	1.42	447	4.88	13	506	6.75	1.9	3.2
Spain	12,287	173	1.42	465	3.80	8	1,620	7.64	6.6	15.9
Sweden	23,333	795	3.47	1,427	6.22	29	1,161	28.09	27	42.4
United Kingdom	16,187	536	3.38	993	6.26	21	4,431	11.59	9.0	7.3
Switzerland	34,164	1,068	3.21	2,012	6.06	32	1,228	9.39	12.01	75.4

Source: MESO elaboration of data from different sources (Meso Report 1998, Dataquest; EITO 1998, Nua 1998)

As clearly evidenced by the available data, there exists a proportional relationship between the level of GDP investments on technologies and technological penetration. Denmark, for instance, has the highest per capita GDP (ECU 27,415) and shows in parallel the highest IT and ICT per capita expenditure (respectively ECU 819 and 1,482), the highest number of PCs per 100 population (33) and the highest percentage of Internet on line users (16). On the opposite side, Portugal which is characterised by a quite low level of per capita GDP (ECU 8,600) shows a low level of IT and ICT per capita expenditure (respectively ECU 130 and 447), and a very small percentage of Internet on line users (1.9%).

With reference to the mobile net, although broadly speaking variations among northern and southern European countries persist in this specific sector, it should be noted that Italy stands out as a very peculiar case. In fact, though relatively low in terms of IT penetration, it has one of the most developed mobile nets among the countries considered. In general terms, the high development of the mobile net in Europe is due to a greater degree of liberalisation vis à vis the fixed network. Mobile communications have in fact been liberalised well in advance of fixed telephony services. Greater competition has allowed for a decrease in prices as well as better services.

As far as cable TV is concerned, it is interesting to note that the Netherlands show the highest percentage (88.5%), closely followed by Belgium and Luxembourg (88.5%) and Switzerland (75.4%). Denmark, Germany, Sweden, Ireland and Norway stick on an average of 40-45%. It is interesting to note that the UK and France, though characterised by a quite good level of technological penetration, show a low percentage of Cable TV subscribers (7.3% for the UK and 10.2 for France).

In order to have a clearer picture of the technological penetration level in Europe, it is interesting to analyse the market value and growth of the IT and Telecommunication market.

As shown in the table below, IT market value is quite high for countries such as Germany, France and the UK, followed by Italy, the Netherlands and Nordic countries.

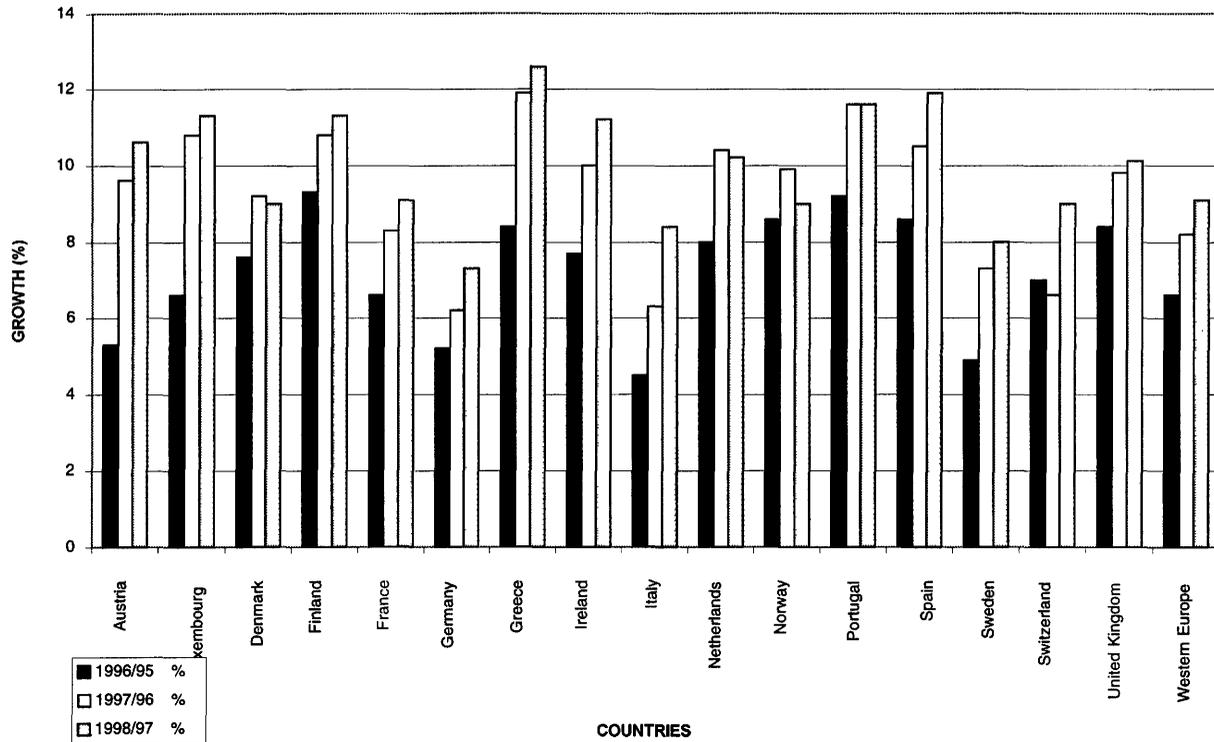
Table 2: IT Market by country (MECU)

	1995	1996	1997	1998
Austria	3,369	3,545	3,886	4,300
Belgium	4,282	4,683	5,190	5,776
Denmark	3,661	3,930	4,291	4,876
Finland	3,239	2,448	2,712	3,017
France	17,826	20,350	11,793	24,085
Germany	36,224	40,224	42,725	45,803
Greece	742	805	890	1,014
Ireland	965	1,040	1,164	1,272
Italy	13,393	13,992	14,879	16,120
Netherlands	7,844	8,563	9,476	10,443
Norway	2,814	3,057	3,361	3,665
Portugal	1,081	1,148	1,288	1,400
Spain	6,702	6,163	6,843	7,655
Sweden	6,219	6,429	7,110	7,877
Switzerland	6,724	7,187	7,871	8,260
UK	16,459	21,662	31,480	34,936
Western Europe	151,517	161,510	174,770	191,542

Source: EITO 1998

Since the dimension of IT market is clearly related to country size, absolute data on IT market growth have also been considered in order to investigate on IT market growth trends (see following graph).

Graph 1: IT Market Growth 1995-98



Source: MESO elaboration from EITO 1998 data

A general increasing trend can be noticed for all the countries considered, but for instance for the year 1998/97 the most impressive variations regard the following countries: Greece (12.6%), Spain (11.9%) and Portugal (11.6%), followed by Finland and Belgium (11.3%) and Ireland (11.2%). This is particularly interesting, especially if related to the low market value of most of these countries as expressed in the table above. This is certainly related to the fact that countries characterised by a not yet fully developed market are investing more on IT than countries such as Denmark, for instance, which can already count on a quite developed market. Furthermore, except for the Nordic countries (Denmark, the Netherlands and Norway), the market growth is foreseen to further increase in the period 1997-98, again showing the willing of countries to strengthen IT infrastructure where it is not yet fully developed.

The market value of Telecommunications for the years 1995-1998 reflects the situation already outlined for the IT market. Once again, Germany, France and the UK are the leading countries, and once again countries with low market value such as Greece, Ireland and Spain show an higher increasing trend of growth than most developed countries. (see table and graph below).

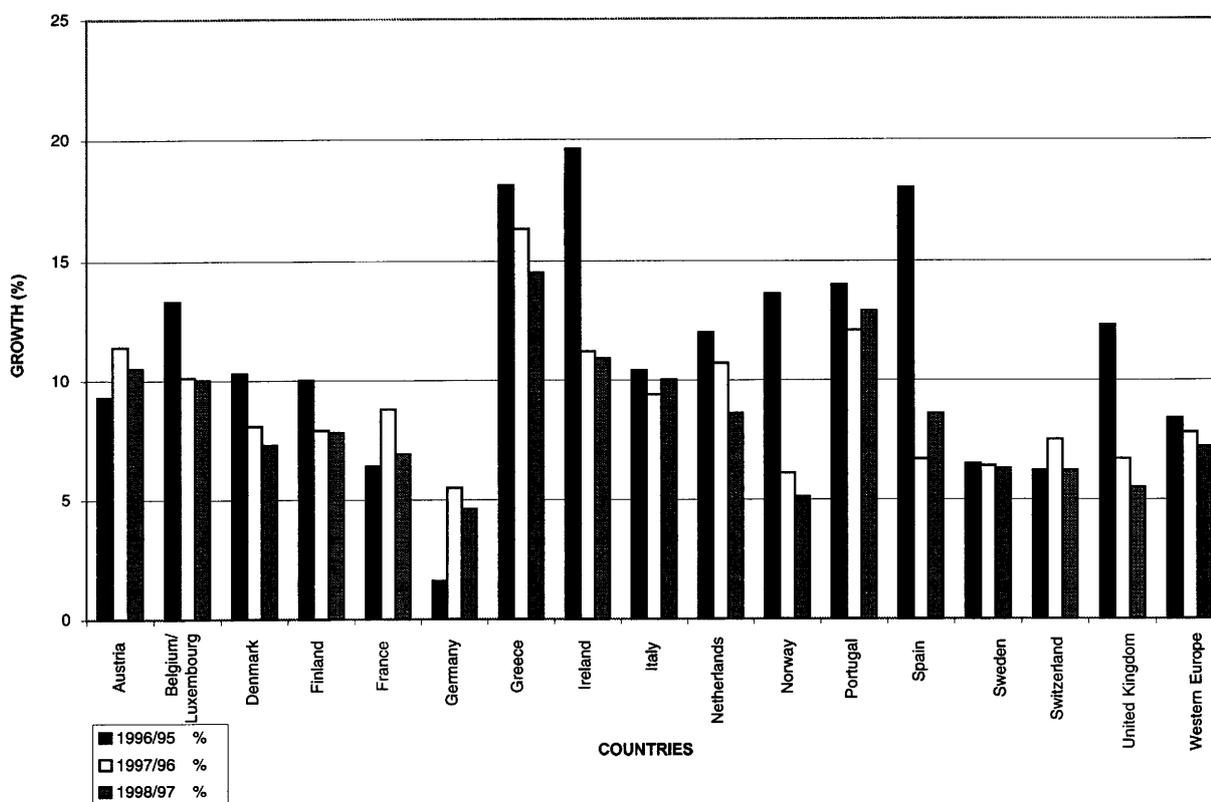
Table 3: Telecommunication market by country (MECU)

	1995	1996	1997	1998
Austria	3 099	3 323	3 700	4 063
Belgium	4 189	4 737	5 237	5 765
Denmark	2 815	3 214	3 476	3 729
Finland	2 183	2 412	2 601	2 805
France	24 229	25 793	28 075	30 023
Germany	40 181	40 840	43 101	45 081
Greece	2 405	2 842	3 205	3 763
Ireland	1 807	1 903	2 138	2 370
Italy	19 603	21 647	23 074	25 046
Netherlands	7 265	6 210	6 087	6 864
Norway	2 647	2 779	2 869	3 089
Portugal	2 641	2 783	3 121	3 582
Spain	9 139	10 766	11 511	12 495
Sweden	4 985	5 208	5 847	6 303
Switzerland	5 244	6 310	6 783	7 205
UK	22 265	25 120	26 601	28 277
Western Europe	155 042	168 046	181 249	194 169

Source: EITO 1998

ICT infrastructure – including pricing and supply conditions set by telecommunication industries – is a very important factor in influencing users' attitudes towards IT. Where monopolistic or oligopolistic arrangements still exist, prices tend to be fixed and do not favour the use of new technologies (especially connections to the Internet). On the contrary, countries with a higher degree of telecommunication market liberalisation allow for greater competition and thus for lower prices, favouring a higher level of technological penetration. In this respect, northern European countries are much more advanced than southern ones.

Graph 2: Telecommunication Market Growth 1995-98



Source: MESO elaboration from EITO 1998 data

2.2 QUANTITATIVE DEVELOPMENT OF SUPPLY

The European supply in multimedia educational products is still limited by a number of factors. Broadly speaking, we can identify four common features that negatively affect the supply side in Europe:

- the market is seldom considered as profitable in the short term and therefore the perceived risks of expanding production are quite high;
- the sales for the home market are mainly based on a low number of titles;
- the supply is sizeable only in four countries (United Kingdom, Germany, France, and to a lesser extent Spain);
- lack of equipment and need for training break upon the market development.

Because of such difficulties, producers have adopted a number of strategies which have allowed for an increase in the volume of sales.

Companies have chosen to focus either on low prices or on high quality, addressing their products to specific categories of buyers. Furthermore, they have undertaken aggressive advertising campaigns and price discounting of new releases so as to widen the number of multimedia consumers.

In order to have a more accurate picture of the supply of multimedia products for education in Europe, we should briefly take a look at the profile of publishers, together with the products and their turnover.

In general terms, European multimedia publishers in education are small private firms, with between 10 and 20 employees working full-time, who have started their activities quite recently, i.e. after 1991. This does not mean that this sector is not interesting for large enterprises (publishers, telecom, broadcasters, etc.) but that the latter normally have created a separate small company to deal with educational multimedia which, in the majority of cases, have not grown to the status of a large enterprise. As from the BASE Survey 1998, 57% of companies in France and Germany, 87% in Spain, 81% in Greece, 51% in Italy and 78% in Portugal have been created after 1991. Among the European countries only a great proportion of British companies have started developing before 1991.

With regard to the number of employees, although the majority of companies across Europe have less than 10 employees, there is also a modest percentage of companies that have between 10 and 20. According to the respondents answering the BASE Survey 1998, directed to the totality of European producers, only Germany, France, the UK and Italy seem to have a significant percentage (7 to 9%) of companies employing more than 30 people.

The table below shows the number of publishers, products and average turnover. Estimates were done on the basis of updated information existing on the countries analysed, and where this information was not available, data were collected from the MESO report 1998 and the BASE Survey 1998.

Table 4: Main features of Multimedia Supply

	Estimated number of publishers	Estimated number of products available	Average turnover MECU**
Belgium	15	10	1.5
France	220	2,200	1.0
Germany	100	1,300 ^o	0.6**
Greece	25	247*	0.6**
Italy	80	700*	<0.35**
Portugal	35	332*	n.a.
Spain	100	1,800	0.6**
United Kingdom	300	5,000	2.5

Source: BASE Survey 1998, Meso Report 1998

- ^o titles which can be purchased separately, including secondary education, post-school education and training. Some of the titles originate in Australia or USA
- * Floppy disks, CD-ROMs, CD-I
- ** Average turnover was calculated on the basis of the turnover range covered by the majority of the suppliers interviewed in the framework of the Base Survey 1998

Data on Denmark, Germany, France and the UK come out from our MESO sources, whereas for the other countries data derive from the BASE Survey and from MESO estimates. As it can be noticed, the number of existing publishers widely varies across countries: the UK, Denmark, France and Germany show a quite high level of established publishers, followed by Spain and Italy. Other countries show a low number of publishers. The same considerations can be obviously made with regard to the number of available products: in countries where the supply infrastructure is developed, the offer will be richer and more articulated.

As for the average turnover, an estimate is very difficult since most of the publishers are reluctant to furnish data which they consider "strategic" for competition. As for the information collected from the BASE Survey 1998, the average turnover was calculated on the basis of the range characterised by the highest distribution level for the interviewed sample. According to the data collected, Denmark and the United Kingdom show the highest level of turnover (2.5 MECUs), followed by Germany, Greece and Spain characterised by an average of 600 KECUs. Italy and France follow with an average of < 350 KECUs.

The presence of Greece in the first group might struggle with the picture outlined with regard to the level of technological penetration which is still rather low for Greece, but several if not most of the few Greek producers develop bi-lingual or multi-lingual products on specific subjects where Greek input is considered unique (History of Art, Culture and Heritage). A further consideration should be made: countries such as the UK, Spain and France can count on a vast international potential market and therefore have more chances to develop their supply in terms of producers and products offered.

In general terms, the quantitative development of supply is high in countries such as France, the UK, the US, Canada and Australia; Nordic countries show a medium level of development (relatively high content coverage, not many products), whereas countries such as Greece, Portugal and Hungary show a low level of development (low content coverage, not many products).

In countries with a low development of supply the relatively low volume of sales produces negative effects on the development of the market as it prevents further investment and this, in turn, does not encourage the production of diversified and higher quality products. Another relevant consequence is that as long as the volume of sales remains low, prices will not fall and this may represent a further obstacle to developing the market.

Precisely because of these bottlenecks, many companies across Europe have started implementing new production strategies. For example, co-operation agreements with national publishers as well as with foreign publishers seem to be increasing. In Italy the co-operation agreements with national publishers is quite high (63% of the producers) while co-operation agreements with foreign producers involves about 20% of firms. Other strategies of reorganisation aimed at enhancing competitiveness include agreements between traditional publishers and SMEs (such as portrayed by Denmark) and agreements between publishers and distributors. Moreover, many small firms have decided to merge or to establish joint-ventures in order to become more competitive and to diversify their supply of multimedia products.

Another relevant phenomenon concerns increasing joint efforts between the public and private sector to develop and or distribute new products in a semi-institutional context. As already mentioned, firms try to promote their products by making special agreements with lower and secondary schools. They include discounted rates, special licence agreements and free connection to Internet for a fixed period of time. This, of course, aims at inducing a higher level of demand which would increase the supply both quantitatively and qualitatively. Traditional publishers still concentrate on other activities than electronic publishing. Yet, there has been a tendency in the last years to increase the number of titles produced in this field.

This is especially the case in Germany where publishers try to meet the demands of their clients. Education and training activities are quite important in Greece where the multimedia supply is underdeveloped and the market (production and commercialisation) boosted by its users. In Belgium more than anywhere else, the production of cultural material is strictly tied to publishers' industry.

It should be also pinpointed that an average of 30% of publishers (obviously the percentage varies across countries) are starting to develop their marketing activities through on-line solutions, consisting both in setting-up a web-page and in proposing products and services on line.

This strategy is considered as vital for the years to come since it permits a direct contact with potential and already existing customers, and a quicker response to the needs of demand.

With regard to products, the main subjects generally dealt with by publishers are: a) games, b) education, c) reference, d) edutainment and e) SoHo products (Small office Home office). There are some variations across Europe in the type of products which boost the electronic publishing sector. Southern European users, besides producing a limited number of products compared to the rest of Europe, tend to invest on games and reference tools where potential buyers are the highest number, even if higher competition can be expected there. In Italy, for example, games amount to 46% of the global market; reference products to 24% of the market whereas education only amounts to a 7%. On the contrary, the main product sold in Belgium is education or training software.

The quality of multimedia products has improved substantially in the last two years, moving away from an unsatisfactory level which had induced negative attitudes among users and intermediaries (teachers, training managers). What has not yet improved much is the distribution of multimedia products.

There are still many problems in devising satisfactory channels of distribution. For example educational programmes are generally placed in the category of edutainment products which does not promote their sale.

In order to solve such inefficiencies more and more publishers are undertaking special agreements with distributors.

Finally, in order to make the picture of supply complete, it is necessary to consider the widespread phenomenon of «home-made» products. In many European countries, especially the UK, France, Denmark and Italy secondary schools and further education colleges are encouraged to develop their own multimedia products in order to satisfy their specific educational needs.

2.3 USE OF ICT IN E&T

The use of ICT in education and training represents a quite direct indicator of market development and it shows, in most but not all cases, a correspondence with that of technological penetration. The use of ICT will be analysed for the following sectors: education, training and home.

EDUCATION

The education sector has not been viewed until now as a very profitable one and has been generally considered as very difficult to enter. The lack of public investment has certainly been one of the most serious obstacles in entering this sector.

Yet, especially in France, Germany, Spain, Italy and the United Kingdom new avenues seem to be opening as a number of recent national policies have set emphasis on the introduction of programmes for educational multimedia. Thus, the education sector is undergoing significant changes, and perceptions on its potential expansion are becoming increasingly positive.

The investment made by European countries in education is summarised in the table below.

2. MARKET OVERVIEW

Table 5: Public/private expenditure in education

Expenditure on Education	Public and private expenditure on educational institutions % of GDP 1997	Higher Education sector expenditure on R & D as % of GDP 1998	Annual expenditure per student (ECU) Primary education 1997	Annual expenditure per student (ECU) Secondary education 1997	Annual expenditure per student (ECU) Higher education 1997	Average annual expenditure per student (ECU) in education 1997	Sales of computers for the educational sector 1997
Austria	5.6	0.52 (1993)	4,521	5,857	8,010	6,129	25,272
Belgium/Lux	n.a.	0.44	2,763 (B)	4,768(B)	5,271(B)	4,267	n.a.
Denmark	7.0	0.47 (1993)	4,067	5,205	7,012	5,428	n.a.
France	6.2	0.39	2,706	4,793	4,958	4,152	189,897
Germany	5.8	0.43	2,764	5,082	6,913	4,920	281,375
Greece	2.4	0.19 (1993)		1,229	2,211	1,720	n.a.
Italy	4.7	0.26	3,655	4,306	4,001	3,987	69,723
Spain	5.6	0.27	2,128	2,698	3,324	2,717	69,457
Sweden	6.7	0.79	4,150	4,537	10,576	6,421	61,748
United Kingdom	n.a.	n.a.	2,772	3,655	6,270	4,232	373,206
Hungary	6.4	0.19	1,386	1,402	4,207	2,332	n.a.
Australia	5.7	0.42	2,434	3,927	8,011	4,791	n.a.
Japan	4.9	0.62	3,390	3,778	7,326	4,831	n.a.
Switzerland	n.a.	0.65 (1994)	4,834	5,981	13,076	7,964	44,684
USA	6.6	0.39	4,372	5,511	12,796	7,560	n.a.

Source. MESO elaboration of data from different sources (MESO Report, Education at a Glance - OECD Indicators 1997, OECD, Paris, 1997)

The Nordic countries (Denmark and Sweden) show the highest level of public and private expenditure on educational institutions as percentage of GDP; respectively 7.0% and 6.7%, followed the US (6.6%), Hungary (6.4%) and France (6.2%). All the other countries lie on an average of 5-6%, except for Greece which counts on a really low investment on education as percentage of GDP, i.e.: 2.4%.

Data on Higher Education sector expenditure on R&D as % of GDP have also been considered, since investment on R&D is strictly linked to the development of a technological infrastructure and to the introduction of new technologies. Unfortunately, the comparison among countries can be done only on the basis of data of different years, since data for the same year were not available. Again, a Nordic country (Sweden) leads with a 0.79%, followed by Switzerland (0.65%), Japan (0.62%), Austria (0.52%) and Denmark (0.47%).

The table further shows the annual expenditure per student in Primary, Secondary and Higher Education for the year 1997. It can be noticed that the higher is the level of education, the higher is the public investment on students. Whereas in southern European countries such as Italy, Spain and Greece the expenditure does not vary a lot, though increasing proportionally to the education level, differences are quite impressive as regards northern European and non-European countries. For instance, Italy shows an increase of 9-10% in the expenditure per student if comparing the primary and the higher education sector, whereas countries like Switzerland, the USA, Sweden and Germany show an increase of 170-200%, which is far more impressive. The average annual expenditure per student has also been considered: in absolute terms, the expenditure is higher in northern European countries, in Austria, Switzerland and in the USA, with an average of 6,000-7,000 ECU. As for the southern European countries, the average is of ECU 3,000, though Greece shows the lowest level of expenditure with ECU 1,720.

As for the sales of computer for the educational sector in 1997, the UK shows the highest value with 373,206 computers sold, followed by Germany (281,375) and France (189,897). Italy, Spain and Sweden show an average of 67,000 computers, followed by Switzerland and Austria.

All the data analysed confirm that northern countries have much more ICT-supportive policies for education than southern ones, though the new initiatives undertaken by governments in the last few years have fostered the introduction of ICT in southern countries as well. The expenditure on education is obviously related to GDP, as well as the sales of computer are related to the size of the country.

However, it is interesting to note that a country like Greece, which shows the lowest average expenditure per student in education, as well as the lowest level of investment in education and R&D as a percentage of GDP, is characterised by the highest growth trend as for IT and telecommunication market (see "Technological penetration" section).

This suggests that in countries where the introduction of ICT is still under development, attention should be focussed not only on the development of technological infrastructure, but also on investment for the training of students and teachers.

In order to further investigate on the penetration of technology in the education sector, data have also be collected on the number of students, teachers and schools in European countries. The following table shows the relationship between these general data and the level of technological penetration in schools represented by two indicators, i.e.: number of students per PC in schools and number of computers connected to the Internet in educational centres. Social indicators obviously depend on the size of population and on the organisation of the school system which widely varies across countries. On the other side, the level of technological penetration reached by European countries reflects the conclusions drawn for technological penetration as such, i.e. the existence of a gap between northern and southern European countries also in the education sector.

Table 6: Technological penetration in the school sector

	Number of pupils/students*	Number of teachers*	Number of schools*	Number of students per PC in schools 1997**	Number of computers connected to the Internet in educational centres, % 1997**
Austria	1.500.000	140.000	10.013	16.4	57
Belgium§	324.825	62.760	n.a.	n.a.	n.a.
Denmark	1.081.692	140.551	n.a.	n.a.	n.a.
France	12.100.000	648.000	n.a.	21.4	48
Germany	14.300.400	577.000	36.727	20.3	56
Greece	1.587.595	120.771	15.937	n.a.	n.a.
Italy	9.080.000	830.000	37.771	42.4	47
Spain	8.250.000	480.000	n.a.	41.2	45
Sweden	1.016.733	111.676	5.577	7.8	60
United Kingdom	10.960.000	628.000	20.554	6.1	56

Source: Meso elaboration of data from different sources: Dataquest, Eurydice, Statistisches Bundesamt: Statistisches Jahrbuch 1997, Bonn; Multimedia Liste 1998

* The data collected refer to the year 1996 and 1997, depending on the source and the information available for the different countries.

** The data collected are available only for some of the countries analysed

§ data on French Community

including Primary and Secondary schools

Sweden and the UK show a high degree with respectively 7.8 and 8.1 students per PC in schools and with 60% and 58% of computers connected to the Internet. Austria, France and Germany do follow, with an average of 20 students per computers and of 55% of computers connected to the Internet in educational centres. Italy and Spain are far behind, with an average of 42 students per computer and 46 % of computers connected to the Internet.

TRAINING

Training represents a growing market sector in Europe. Its development is linked to the emergence and consolidation of a new conception of the work organisation which, in turn, is related to the fast changing nature of the market dynamics and its needs. Competencies evolve rapidly especially as a result of the widespread diffusion and development of new technologies.

In the information society, up-dating and re-training is becoming a vital and integral part of employers' skills. Not only are employers expected to cope with an increasingly changing environment, but jobs as such are also becoming more and more flexible. The fact that there is no longer a "job for life" has increased the need of re-training and has also contributed to boosting this sector.

On the overall, training and re-training programmes for employers and employees have become increasingly important in the European corporate sector. Companies are placing great emphasis on multimedia training since they present two significant advantages: they allow to save resources on traditional training and they allow a quick adaptation of skills to the market changing needs. At present, corporate training is most needed in technical IT skills and this means that there is great potential for multimedia training and education. The latter is viewed as having the ability to deliver high-quality, highly focused and detailed training and education materials across a wide geographical area (Datamonitor, 19, 1997). The leading industries are banking, retail, and petro-chemical, where large organisations have a major weight but several developments are taking place in smaller enterprises, through the implication of intermediaries (Associations, Chambers of Commerce, etc.) in the training provision and funding system.

Training and re-training programmes are experiencing a growing demand all over Europe, especially in northern European countries.

In the United Kingdom, for example, training providers are increasingly involved in government-launched programmes precisely because life-long learning has become a major national priority.

The more suitable products/services as far as the training sector is concerned should be those based on on-line delivery directly on the workplace , but just few companies can rely on a technological infrastructure able to support the delivery of these services.

Most of the companies are still linked to a classroom-based training with occasional use of multimedia stand-alone products.

The following tables give an outlook of the level of technological penetration reached in the training sector.

Table 7: IT penetration in the training sector

Western Europe	Number of Business PCs per 100 White Collar Workers
Austria	50
Belgium/Lux.	51
Denmark	64
France	56
Germany	44
Greece	26
Italy	44
Norway	81
Portugal	24
Spain	44
Sweden	75
Switzerland	76
United Kingdom	56
US	100
Japan	16

Source: EITO 1998

As it can be noticed, Europe has an average of 52 computers per 100 White Collar worker, whereas the US value is double. It is clear that Europe still has a long way to go in order to reach a comparable level of technological infrastructure in this sector, though figures for some European countries (Norway, Sweden, Switzerland) can be considered satisfactory.

The increasing level of technological penetration in the training sector can be observed in the following table.

Table 8: Estimated Internet and Online Users in Europe

	1995	1996	1997	1998	1999	2000	2001
Business Users	6,464	9,251 12,220	12,247 12,204	15,141 12,279			
Home users	5,862	8,637 11,268	16,231 27,017	27,628 52,304			
Western Europe	12,326	17,889	23,928	31,478	40,911	52,981	66,673

Source: EITO 98

The number of Internet on line users grows substantially from one year to the other. By the way, if we compare the Business and the Home use of Internet, we will notice that the home sector rate of growth is far more impressive than the training one: Business Internet on line users are expected to more than double between 1995 and 2001, whereas home users will quintuplicate in the same range of time. However, it should be reminded that the home use of Internet can be related to training issue, since training can also take place at home (SOHO products).

HOME

The home sector has boosted the market development of educational CD-ROMs and, to a lesser extent, on-line services in many European countries, especially in those with a high degree of technological penetration. Countries with a more developed Internet infrastructure and lower access costs have shown a greater demand for Web-based services, although compared to off-line products these have experienced a much lower demand.

The following table summarises the typology and frequency of PC use in the home sector.

2. MARKET OVERVIEW

Table 9: Typology and frequency of PC use in the home sector

	PRIMARY PC USER							
	France	Germany	Italy	UK	USA	Japan		
Child under 6 year	0	0	1	1	1	1	2	
Child 6-12 year	4	4	5	6	6	5	2	
Teenager: 13-18	14	9	15	11	11	8	3	
Child 19+not attending college	6	6	18	3	3	4	4	
Child 19+ attending college	14	6	12	10	10	4	8	
Male head of HH	42	57	39	47	47	42	63	
Female head of HH	18	16	8	19	19	34	5	
Other adult in the HH	2	2	2	3	3	2	13	
FREQUENCY OF USE								
At least once a day	44	50	53	46	46	65	54	
2-3 times per week	34	38	27	36	36	26	23	
Once a week	11	7	10	8	8	5	14	
Once or twice a month	5	2	5	4	4	3	5	
Less than once a month	5	2	3	4	4	n.a.	3	
USE OF MODEM FOR ELECTRONIC COMMUNICATION								
At least once a day	16	19	34	32	32	n.a.	21	
2-3 times per week	31	31	17	44	44	n.a.	18	
Once a week	6	29	12	15	15	n.a.	20	
Once or twice a month	11	8	14	1	1	n.a.	11	
Less than once a month	13	10	0	8	8	n.a.	16	

Source: EITO 1998

As it can be noticed, data widely vary across the countries analysed: 2% of PC users in Japan are children under 6 years. The US, UK and Italy follow with a 1% of users of that age. As for children aged between 6 and 12, the average lies in a 5% with a quite homogeneous distribution. Things change if we look at teenagers and adults: as for teenagers, 15% of the Italian PC users are aged 13-18. France and the UK follow respectively with a 14% and a 11%.

However, divergences are much more impressive for adults: people aged more than 19 have been divided into two categories: those attending college and those not attending college, and presumably working. Italy leads in both categories with a 18% for those not attending and a 12% for those attending college and shows an opposite trends with respect to other countries in which the percentage of users attending college is higher than the percentage of users not attending it. In all the countries the percentage of male users is far higher than female users.

As for the frequency of use, the table shows that computers are mostly used at least once a day (65% for the US, 54% for Japan and 53% for Italy), followed by Germany (50%), the UK (46%) and France (44%). Also the percentages of the 2-3 times per week are quite high, whereas the table shows low percentage of sporadic users.

The use of modem for electronic communication is clearly linked to the frequency of use of PCs. Percentages are particularly high for Italy (34%) and the UK (32%), whereas other countries have an average use of 20% as for the "at least once a day" use.

With regard to the demand of the home sector, it should be noted that the consumer market is the largest user segment of multimedia since the majority of PCs are sold to home users. Within the range of products supplied by the market, games and entertainment are among the most requested items whereas education and edutainment CD-ROMs have not yet reached the same size of demand. There are, however, significant variations among European countries. There is, in fact, a higher demand for such products in France, Germany and Scandinavia than in southern European countries. Yet in the long run the demand for multimedia products should become more homogeneous across Europe as the less developed regions increase their level of technological penetration. It is sure that the demand for hardware and software is rapidly increasing in southern European countries and it can be expected that a growth in home PC penetration will foster the growth of the home market for multimedia in training and education.

The following table summarises the current use of PCs in households classified by subject, together with other indicators showing the level of technological penetration in the home sector.

Table 10: Current use of PCs in the home sector

	% of HH owning MM PC ^c 1997	Current game/entertainment use of PCs among PC-owning households, % of HH ^c 1997	Current children's education use of PCs among PC-owning households, % of HH ^c 1997	Current adult's education use of PCs among PC-owning households, % of HH ^c 1997	Current office/business related use of PCs among PC-owning households, % of HH ^c 1997	Satellite dish for TV penetration % of HH 1997	Users of the Internet in 18-49 age class % 1997	Average weekly hours on the Internet 1997	Households with Internet access, CAGR 1996-2001
France	32	68	39	31	50	8	91.3	6.9	90.2
Germany	37	63	29	42	41	29	85.9	5.8	59.6
Italy	29		42	44	57	4	95.7	7.4	63.1
United Kingdom	28	58	35	33	50	18	91.7	8.8	56.7

Source: EITO, 1998

As for the year 1997, Germany shows the highest percentage of Households owning a multimedia PCs (37%), followed by France (32%), Italy (29%) and the United Kingdom (28%). PCs turn out to be mostly used for game and entertainment purposes in all of the four countries; the average percentage of use for educational purposes is 35%. As for the office/business related use of PCs among PC-owning households Italy and France are leaders with respective values of 57% and 50%. With regard to the adults' education use of computers, in Italy and in Germany the percentages are quite high (44-42%) if compared to those of France and of the United Kingdom (31 and 33% respectively).

The percentage of households owning a satellite dish is rather high only in Germany, (29%) whereas Italy shows a really low percentage: 4%.

The percentage of households with Internet access is expected to dramatically grow in the next few years, since in year 2001 at least more than half of the population is expected to be connected (the value is particularly high for France, which shows a 90.2% of households connected). Internet users seem to belong mainly to the 18-49 age class, and the weekly hours on the Internet are on average 7.2 for the countries analysed.

In general terms, the increasing institutional demand for educational multimedia products (due to: higher quality of products; declining costs of multimedia hardware and software and government initiatives promoting the use of multimedia and technology within schools) has directly affected the demand of the home sector as parents tend to buy the same computers for home use as those used by their children at school. Moreover, children themselves become more interested in multimedia products wanting to explore at home the many opportunities offered by these tools.

In short and according to the data collected, there is substantial optimism concerning the growth of multimedia products and services for the home and education sector in Europe. As a matter of fact, the total expenditure in this sector is expected to grow due to declining prices and/or higher quality of products. Nevertheless, the CD-ROM market will continue to hold the largest share of the home education sector.

In fact, although the number of Internet users is expected to grow at a faster rate than the CD-ROM users, off-line products will continue to hold a greater share of the home education market in the next few years, after which integration of off-line and on-line solutions will probably be the rule rather than the exception.

2.4 MARKET MECHANISMS AT WORK

All the issues analysed up to this point were based on quantitative data, and therefore supported by statistical data and estimates about future trends. This approach cannot be kept for the analysis of market mechanisms at work, since this is a rather qualitative issue, being based on general considerations about the qualitative level of market development of the different countries, on the basis of the following indicators:

- ◆ Availability of information on supply
- ◆ Established reference market prices
- ◆ Developed import-export activities
- ◆ Consolidated distribution channels

The **availability of information on supply**, that is the existence of magazines, catalogues, directories and databases and more in general, information on multimedia products available has not reached, on average, a satisfactory level of development as far as European market is concerned: easy availability of information on supply is particularly consolidated in countries like France and the UK, and, to a lesser extent, Germany. On the other hand, southern European countries do not show an established network of information sources, and this may be due to the lower level of multimedia market development reached. Countries lacking of this kind of information flows should probably focus on their development, since the more information customers get on multimedia products and services available, the more their demand will rise in quantity, and obviously in quality (awareness of supply, criteria for choice, etc.).

As for **reference market prices**, in some countries such as the UK, France Denmark and other Nordic countries reference price plans classified by typology of products are emerging, and this shows an incipient market maturity. In countries such as Denmark and the United Kingdom, for instance, there are different prices for multimedia educational products according to the different market segments. Prices are kept down for lower and secondary education as they guarantee a certain volume of sales whereas prices for the training sector are much higher, but tend to decrease through licensing agreements for multiple use within a user organisation.

Prices for multimedia products are generally diminishing in southern European countries due to the increase of competitors in markets which have not yet reached a sizeable dimension and due to an increased degree of professionalism among providers. In Italy, for example, new products are launched through special rates for a fixed period of time. Furthermore, it is important to underline that also telecom prices are decreasing in such countries thanks to a higher degree of market liberalisation.

As the process of market liberalisation is completed, prices are expected to fall even more.

The possibility of moving from a low-volume/high-price situation to a high-volume/low-price situation is now appearing as plausible in the United Kingdom, maybe opening the way for similar trends in the rest of Europe. What can be observed is a generalised trend towards a reduction of prices, accompanied by a significant but not spectacular growth in the number of sales.

On the whole, prices have dropped in the consumer market and this, in turn, has increased the purchase of educational software. The fall in prices has been determined by ensuing competition among multimedia producers and by a growing demand, especially among young people, partially due, as already mentioned, to national initiatives in promoting educational programmes in schools.

With regard to **import-export activities**, Europe continues to run a trade deficit in IT and telecommunications products. After the improvements in 1993 and consolidation in 1994, the EU ICT trade balance with the rest of the world has worsened again, passing from -17.7 billion ECU in 1995 to -18.2 billion ECU in 1996. On the other side, extra-EU exports rose by 21.8% from some 20 billion ECU in 1995 to some 24.4 billion ECU in 1996 (EITO, 57, 1998).

Most European countries still have great problems in developing a strong supply of multimedia products for education, and so in competing with the United States and other developed countries such as Canada and Australia. Although some European countries are able to export their products, the average percentage is still low. Exception are represented by countries such as the United Kingdom, France and Spain. The United Kingdom exports its products mainly to the US, to Anglophone Canada, to the former USSR and to Asia. France directs its exports to Quebec, and to the EU (Belgium and Switzerland first of all) and Spain has its major foreign market in Latin America. Northern European countries tend to have either intra-EU or intra-nordic international exchanges, whereas the remaining countries are still mainly characterised by a national production, rarely internationally-oriented, although the practice of producing in the national language and in English at the same times diffusing in Italy and Greece.

The following table summarises the export flows of European countries.

Table 11: European countries' exports

	Rank 1	Rank 2	Rank 3
Germany	USA and Canada	Germany, Japan	USA, UK
French-speaking Belgium	USA and Canada	including Québec	
Spain	Latin America	European Union	USA and Canada
France	European Union Switzerland	Quebec	USA and Canada Mediterranean basin and Middle East Africa
Greece	European Union	USA and Canada	
Italy	European Union		
Portugal	European Union	Brazil	
United Kingdom	European Union	USA and Canada Mediterranean basin and Middle East Former USSR	Asia, South Pacific Africa

Source: BASE Survey 1998, MESO Report 1998

There are several factors that account for the already mentioned differences. As far as multimedia programs for education are concerned, there is both a linguistic and cultural problem of adaptation. Countries such as Italy or Greece have to invest a higher amount of resources in order to export their products as they need to create a "double supply": one for their own country and one specifically designed for export. On the contrary, the United Kingdom, Spain and France have greater chances of exporting, thanks to the widespread use of their languages throughout the world. Moreover, because of cultural ties they have kept with the countries of their language area, cultural adaptation does not always seem to be a major problem.

Broadly speaking, however, Europe is still behind other international competitors as it is a relatively young market and most producers, taken individually, do not have the necessary capital to narrow down its technological gap.

As far as the **distribution channels** are concerned, major suppliers still claim an unsatisfactory organisation of distribution and therefore prefer to use their own distribution networks. In general terms, it can be noticed that the preferred distribution channel varies according to the market publishers are addressing to: direct sale or sale through mail order are the preferred channels when dealing with specifically targeted markets, such as respectively large companies or SMEs.

Thus, multimedia training products/services are distributed directly from the producer which in this way can also have the chance to assist customers in the first phases of use.

In some countries, such as Germany, Greece and the US, the corporate market is reached by producers also via on-line sales. If in the US this distribution channel is already well developed, in Europe it is still at its initial development stage.

As for the multimedia products addressed to the home market, they are mainly sold by bookstores, hyper- and software markets and music and video chains. An exception is represented by Italy, where CD-ROMs of educational, professional and edutainment content are mainly sold by newsagents' kiosks, due to the marketing policy of many publishers/newspaper and magazine publishers who try to increase the mass consumption of multimedia by selling them at competitive, low prices together with newspapers or magazines.

With regard to educational multimedia products, the distribution still lacks a satisfactory organisation. In most of the countries educational and edutainment products are sold in either through distributors or through bookstores and software shops, but publishers claim that, in the second case, educational products are generally situated with entertainment products which is not really favourable to their sale; furthermore there are generally few specialised assistants who could advise potential buyers. On the other side, shops specialised in the distribution of educational products are relatively conservative and unconvinced by multimedia products

2.5 CONCLUSIONS

The analysis of the four issues defined as relevant in furnishing a clear picture of the state of the art of multimedia market development in European countries has brought about the results summarised in the following qualitative table (for quantitative data, see the above sections).

Table 12: Synthesis of market development factors

	Penetration of technology	Quantitative development of Supply	Use of ICT in E & T	Market mechanisms at work (info, prices, etc.)	Overall
Australia	High	High	High	H	
Canada	High	High	Medium High	H	
Denmark	High	Low	High	H	
France	Medium High	High	Medium	M → H	
Germany	Medium High	High	Low	M → H	
Greece	Low	Very Low	Low	L → M	
Hungary	Low	Very Low	Low	L → M	
Ireland	Medium High	Medium High	High	M → H	
Italy	Medium	Medium	Low	M	
Japan	Low	Medium	Low	L → M	
Norway	High	High	High	H	
Portugal	Low	Very Low	Low	L → M	
Spain	Medium Low	Medium High	Low	M	
Sweden	High	High	High	H	
United Kingdom	High	High	High	H	
USA	High	High	High	H	

Source: MESO Report 1998

As it can be noticed, only northern European countries (Denmark and Sweden), together with the UK and, to a lesser extent, France, show a degree of development somehow close to the world leading countries' performances (USA, Australia and Canada).

Southern European countries are generally characterised by a low/ medium-low level of technological penetration, by a low use of ICT in Education and Training and by a weak supply infrastructure, lacking of course of market mechanisms at work as well.

By the way, if we take into account the expected rate of growth of the IT and telecommunication market for southern countries, which is characterised by an impressively positive trend, and if we consider the increasingly active role of southern European governments in fostering the development of a multimedia market, we can expect a significant development of the multimedia market in southern European countries both in qualitative and quantitative terms.

It is still uncertain whether this trend will manage to narrow the existing gap and overcome the fragmentation which is one of the main weaknesses of the European market as a whole, but it should in any case be considered as a positive phenomenon to continuously be monitored in order to help institutions and suppliers to better satisfy an evolving demand with the most suitable policy and marketing initiatives.



3.
POLICIES



INTRODUCTION

This chapter intends to provide a general overview of public policies affecting the European MM market for education and training.

3.1 EUROPEAN POLICIES

The development and introduction of multimedia products for education has become a major concern for most European governments, especially in the last few years. Yet, the degree of development of such products and the market dynamics significantly vary across Europe.

In general terms, the following differences between northern and southern European countries may be identified:

- ♦ northern European countries (in particular, Denmark, Sweden and the UK) seem to have achieved greater results in this field than most southern European countries have (though some significant regional variations, such as for example the case of Catalonia in Spain, do exist). These differences may be explained in part by the fact that southern European countries have started launching national programs for ICT integration in the education sector only recently and in part by the lower degree of technology penetration in such markets.. By the way, it should be outlined that southern European countries such as France and Italy and Spain have been developing a new overall approach since 1997 characterised by more articulated and integrated programs (equipment and training) which seem to engender higher expectations;
- ♦ another striking difference is given by the type of approach adopted: bottom-up oriented for the northern European countries and top-down oriented for the southern European ones. Such differences are determined, in part, by diverse national policy orientations but, in part, also by different structural needs. In countries where the use of new technologies in education is not widespread at a local level, the intervention of the state «from above» may represent a significant driving force in fostering multimedia educational programmes. In this respect, France has been induced to adopt a top-down strategy which, although quite important in boosting this sector, has not always produced the expected results. In general terms, if it is true that a direct involvement of the state is auspicious, especially where the multimedia educational market is not widely developed and where there is a lack of demand for such products, it is also true that programs should be devised involving its recipients;

- ◆ with regard to educational policies and the priorities set by national governments in devising programs aimed at enhancing the multimedia educational market., three main trends may be identified within the European Union. A first group of countries (among which Denmark, Germany) gives priority to policies that enable an adequate integration of technology within education and training; a second one to Life Long Learning programs (such as for example in the United Kingdom) and a third one (which includes Italy and Spain) which adopts an instrumental approach, looking at the introduction of multimedia in education and training as an opportunity to reorganise and modernise their educational systems.

A fourth trend may also be identified, but it is not exclusively peculiar to Europe (as it also includes Australia and to a certain extent the US): in many northern European countries there is a tendency to adopt policies which enhance equal access of all citizens to multimedia technologies for education. Not only is it viewed as an important end in itself, but also as a means to foster a high degree of homogeneity in education among all sectors of society. Multimedia technology for education is considered as a strategic tool to incorporate marginal groups or geographically removed groups into the learning society.

Although generally mainstream policies are quite different across Europe, the initiatives of the European Union in this field have greatly contributed to developing and fostering a common awareness of the importance of multimedia in training and education. In particular, the pilot projects set up by the Commission in different European countries have become an important driving force in the overall national developments, especially in those countries which had not yet developed sufficient experience in this field. Building an integrated information society has become one of the EU top priorities.

Also thanks to the establishment the Educational Multimedia Task Force and all the related EU Programmes, European governments along with businesses and communities have been increasingly active in:

- a) the development and support of a multimedia supply base;
- b) the encouragement of the use of multimedia in corporations, vocational education, mainstream educational establishments and homes;
- c) the increased investment in technological research and the establishment of an information superhighway (Datamonitor, 1, 1997).

Table 1: Public Policies/Present Stimulus

COUNTRY	Denmark	France	Germany	Greece	Ireland	Italy	Norway	Portugal	Spain	Sweden	United Kingdom	Hungary	Australia	Canada	USA
High															
Medium/High															
Medium															
Medium/Low															
Low															

EXTRA EU

Source: SCIENTER Bologna • Eden Budapest • Edru-Tavistock London • Fim Erlangen • Guildford Education Services • Iclate Montpellier • Knowledge Connection Toronto • Lambrakis Research Foundation Athens • Oravep Paris • Orfeus Aarhus • Ienm Salzburg • Rai Rome 1997

3.2 MESO POLICY SURVEY

In order to collect expert view on options for public policy developments in Europe, we have devised a Delphi Policy questionnaire that has been submitted to a sample of 40 informants across Europe.

The aim of the questionnaire was to collect European experts' opinions on the factors which are most likely to inhibit or enhance the development of the multimedia market for education and training, and on the most appropriate policies to influence them.

The questionnaire has been divided into 5 general categories, and results can be classified as follows:

1. *Factors affecting market development*

FACTORS	RELEVANCE				
	LOW	LOW/ MEDIUM	MEDIUM	MEDIUM /HIGH	HIGH
Cultural awareness and maturity					
Technological infrastructure and penetration					
Market size and market mechanisms					
Legal and structural frameworks					
Supply structure					
Other elements					

As it can be seen from the table above, respondents have not discriminated among the broad categories proposed, each of which was considered sufficiently relevant. Differences of relevance emerge only within categories:

- ♦ in the experts' views, negative attitude in the teachers and trainers communities have hither to inhibited the development of multimedia in education and training, and the lack of coherence in public policies has also been a conditioning factor in delaying such development;

- ◆ the impact of technological and infrastructure penetration in the upper secondary school sector as well as for training providers and large enterprises is considered essential by experts in fostering the development of multimedia market for education and training. Besides, the focus of attention should be put on training providers and other intermediaries access and competencies, rather than on final users' access to technology;
- ◆ easy access to relevant market segments, i.e. appropriate information and distribution mechanisms is considered as the most relevant factor in affecting the market size and market mechanisms . This confirms the observations collected by the MESO observatory on the lack of information on supply and the insufficient development of distribution systems for MM educational products;
- ◆ the absence of regulatory mechanisms which inhibit proper use of multimedia learning resources and methods in the education and training systems is viewed as relatively relevant factor in influencing the development of MM market for education and training. The same opinion has been expressed with reference to transparent and effective decision-making, budgeting and purchasing processes within the education and training systems;
- ◆ among the factors that are most likely to affect in positive terms the MM market for education and training, experts have signalled out the access to risk capital for small providers with high creativity as well as the ability to build alliances and contacts across segments and in the international arena, i.e. to strengthen competence and avoid fragmentation;
- ◆ the relationship of multimedia learning materials to academic and vocational qualifications as well as the existence of funding mechanisms for sectors and segments that are not profitable in the short term could represent, according to our respondents, very important factors in developing the MM market, together with quality assessment and certification procedures that may increase the trust in quality of products and services (but not inhibit creativity and new development) and the ability to re-use products resulting from public funded pilot projects (question of ownership, commercialisation, legal rights, etc.).

As a whole, the focus was put on intermediaries, market organisation, access to investment capital and public policies rather than on users' attitudes and behaviour.

In our interpretation, this shows a high degree of confidence in the development of the demand, and a set of recommendations to intervene on potential barriers in the development of the supply on in the channels that connect supply to demand (intermediaries, information, support for low profitability, segments, etc.).

2. Typology of public intervention

As far as public intervention is concerned, experts believe that the most effective public measures that could contribute to the development of the MM market are: a) educational and training policies that value multimedia and open learning equally with more traditional methods; b) access to networks/equipment from public locations; c) support centres for users; information services; d) establishment of common technological platforms; training of: teachers; e) Training of trainers; incorporating ICT in school curricula; f) software exchange pool (Nordic countries). Furthermore, our survey tells us that:

- ◆ equivalence of ODL and multimedia with conventional learning method is an objective of major importance to develop the MM market;
- ◆ the preferred path to market development is indicated to be the one that passes through the innovation of education and training system (training of teachers and trainers, integration in the curricula) rather than through the development of the home market;
- the concern about the public access by less advantaged parts of population is an important one in expressing preferences for certain public measures rather than others.

3. Objectives of public intervention

According to the experts contacted the most relevant objective of public policies in Europe for the development of MM market for education and training is the education and training systems capacity of meeting the new needs of the labour market as well as the need for measures to include all segments of society (e.g. schooling, for example, should be the equaliser that allows all members of society to function at the same level with regards to multimedia usage).

To a lesser extent other effective policy objectives would be: the innovation of existing education and training systems, in terms of quality (design, teaching resources, international dimension), of access and cost-effectiveness; the development of a new cultural industry for Europe and the development of telecom-based educational services through satellite and cable network operators.

This result shows again the social concern expressed by respondents on the need that public policies in this field be oriented primarily on social objectives (access of disadvantaged group, access to employment) and not only on industrial policy goals. It should be noted, however, that all orientations were considered as highly relevant.

4. Involvement of private actors in the policy making exercise

As far as the role that “private actors” could play in public policies in this field, it should be noted that in general experts believe that they can affect in positive terms its development. In particular, and with respect to the role they could play in supporting public initiatives by providing additional funding, experts agree that telecom companies, media industry and employers association could be an effective factor of development. In addition, they believe that telecom companies, media industry, employers associations as well as teachers and students associations can play a significant role in establishing standards of technology and good practice.

Teachers and students association, trade unions, and employers associations are also seen as being a quite positive potential factor in participating in the definition and evaluation of public initiatives.

Subject to certain conditions, telecom companies, media industry, employers association, trade unions as well as teachers and students associations could be relevant actors in implementing public initiatives.

Telecom companies and media industry are also seen as displaying great potential in providing resources/services at a reduced price to education institutions.

5. Tasks of a European Foundation to develop the E&T multimedia market

TASKS EUROPEAN FOUNDATION	RELEVANCE				
	LOW	LOW/ MEDIUM	MEDIUM	MEDIUM /HIGH	HIGH
Information provision for users					
Observatory on market trends					
Provision of venture capital					
Brokerage to bring together suppliers of capital and those needing it					
Help Desk for those small scale projects which intend to grow, but do not have the necessary marketing/dissemination expertise to cope with the market					
Definition of standards for the multimedia industry					
Support for transnational mobility of learning programmes and products					
Strategic advice to the EU Commission, National Government and Industries					
<i>Implementation of a system of “licence mixte” for particular subjects</i>					

As far as the European Foundation for education is concerned, experts have highly rated most of the proposed tasks in terms of relevance for the development of a MM market for training and education.

In particular, the most relevant tasks are:

- ◆ support for transnational mobility of learning programmes and products;
- ◆ strategic advice to the EU Commission, National government and Industries;
- ◆ information provision for users, observatory on market trends;
- ◆ brokerage to bring together suppliers of capital and those needing it;
- ◆ help desk for those small-scale projects which intend to grow, but do not have the necessary marketing/dissemination expertise to cope with the market;
- ◆ implementation of a system of “licence mixte” for particular subjects.

Quite relevant tasks, though less than the above mentioned, are the following: the definition of standards for the multimedia industry and the provision of venture capital.

On the overall, the idea of establishing a European Foundation for education (and its proposed tasks) has received favourable comments and, according to the experts contacted for our Delphi policy questionnaire, it could represent an effective factor in enhancing the development of the MM market for education and training.

4.
SUPPLIERS CATEGORIES



INTRODUCTION

The European educational multimedia publishers sampled for this survey are companies that have been financially involved in developing and producing multimedia learning materials, though they may have also negotiated the commercial dissemination rights. Multimedia learning materials include educational and training software, reference tools (encyclopaedias, dictionaries), cultural tools and, to a certain extent, career guidance and edutainment software.

According to our data, there are about 600 organisations in Europe: 100 to 200 in France, Germany and The United Kingdom, about 50 in Italy and Spain and less than 30 other EU countries.

In general terms, European multimedia publishers in education and training are small private companies, with between 10 and 20 employees working full-time, who have started their activities quite recently, i.e. after 1990. This does not mean that large enterprises are not interested in this sector. On the contrary, multimedia publishers seem to come from different industrial and service background (publishing, video, consultancy, training, etc.).

Moreover, if it is true that publishers continue to engage in other activities than publishing, it is also true that they are becoming more and more concentrated. They are mainly the production for outer customers and the multimedia advice with a strong answer rate in Germany.

In Greece, the market has started developing only in the last few years and thus users still play a crucial role in the decisions concerning production and in marketing strategies. In French-speaking Belgium, production is closely linked to the book industry whereas elsewhere there has been a progressive reduction of such a link, even if it remains still relevant.

Many companies across Europe have started implementing new production strategies. For example, co-operation agreements with national and foreign publishers seem to be increasing. In Italy the co-operation agreements between national publishers is quite high (63% of the producers) and co-operation agreements with foreign producers involve about 20% of the Italian firms.

Other strategies of reorganisation, aimed at enhancing competitiveness, include agreements between traditional publishers and SMEs (such as portrayed by Denmark) and agreements between publishers and distributors. Moreover, many small or medium firms have decided to merge or to establish joint ventures in order to become more competitive and to diversify their supply of multimedia products.

¹ These figures would have been higher if we could have taken into account the whole production sector.

Two types of actors can clearly be distinguished within the category of multimedia publishers: companies of an average size with a low turnover and very big groups.

4.1 THE "MAJORS"

The first group of suppliers operating in the pedagogical multimedia market is composed of subsidiaries or departments of international groups with a wide range of activities. Their share of the pedagogical multimedia market is quite significant as they aim at producing reference tools (encyclopaedia, dictionaries) for the domestic market or multimedia supporting programmes. In addition, they sell in a wide number of European countries through their subsidiaries. The latter are mainly based in Germany, France and the United Kingdom. A few of them also try to penetrate non-European markets.

THE EUROPEAN COMMUNICATION GROUPS

These groups are present in different sectors: press, on-line services, multimedia, etc. and are mainly linked to traditional publishing houses. Pearson in the United-Kingdom, Bertelsmann in Germany, Vivendi and Lagardère in France represent them. Their subsidiaries or specialised departments produce cultural CD-ROM, encyclopaedias or edutainment CD-ROM prevalently aimed at families.

Havas Interactif has been created in 1998 by the merger of Liris Interactif, Arborescence and Havas Edition Electronique. Later on Vivendi, the former Compagnie Générale des Eaux, has overtaken Havas. In the case of the Lagardère Group, Hachette multimedia and Grolier Interactif have merged creating Hachette Multimedia Education.

The Pearson Group amalgamated a number of its companies, operating in the multimedia and Open Learning field (Open College, Henley Management, Training Direct), into a new subsidiary company: the Financial Times Management. At the same time Pearson has sold the multimedia publisher Mindscape, and it has bought Simon & Schuster, an American giant publisher specialised in education and reference tools. It is thus very difficult to estimate at the moment what the next strategy of Pearson, in the field of educational multimedia, will be.

Mergers, reinforcements and restructuring as well as alliances in the encyclopaedia world between Havas Interactive, Bertelsmann and IBM-World Book have been undertaken in order to compete against the Microsoft leadership. At the same time, Bertelsmann has sold its multimedia subsidiary, BMG Entertainment, to the American publisher Take2.

THE SUBSIDIARIES OF AMERICAN COMPANIES

The fame and the expertise of small companies like Edusoft or Coktel were sufficiently important as to attract American groups. Today TLC-Edusoft is the French subsidiary of « The Learning Company » which is leader in the American market of pedagogical and cultural CD-ROM. In March 1998 Pearson has sold Mindscape to TLC who, in turn, has recently bought its competitor Broderbund. Thanks to these mergers, and according to PC Data, TLC should now hold 40% of the American educational software market.

Coktel has been taken over by the group Cendant, itself the outcome of a fusion between CUC International, an American publishing and direct marketing giant, and HFS, another giant of the hotel management sector. Cendant has also recently acquired Syracuse that is specialised in languages learning products. Cendant is now aiming at being the first worldwide company doing «business at distance»: games and pedagogy are the principal means to attract people to the Internet. At present, these two subsidiaries dominate the general public market of multimedia supporting programmes.

The position of Microsoft on this market is also important: the American company is leader with respect to referenced publishing products with Encarta and earns correctly in the edutainment sphere.

The strategies of the world groups concern the products publishing as well the networking training. The American publishing company Mc-Graw Hill has a wide activity in matter of education and recently it has acquired Xebec Multimedia Solutions, the English interactive learning company. Xebec will become part of Mc-Graw Hill Lifetime Learning, helping in its bid to become the world's largest library of interactive soft skill courses. The US-based Global Knowledge Network of Waltham, Massachusetts have bought the German networking training company, ICON.

THE PUBLISHERS OF VIDEO GAMES

French companies, Infogrames and Ubi Soft, have become in several years crucial actors on the European, and sometimes international, market of video entertainment and edutainment systems. They produce or co-produce scholar assistance products and cultural CD-ROM addressed to the family market. In fact, they occupy an important position on the market. With the development of educational multimedia, some companies –such as Infogrames- have proceeded to a redefinition of their objectives in order to allow the educational publishing pole to enlarge its sphere of action beyond the production of game software.

The European strategy of Infogrames has been reinforced, last year, by the purchase of the German company Philips Media after it had already taken over the British company Ocean and the French Emme.

The international strategy of Ubi Soft is also strong, its distribution activity covers 49 countries and the publisher has just created a subsidiary in Denmark.

THE TELECOMMUNICATION OPERATORS

The telecommunication operators, such as France Télécom in France or Deutsche Telekom in Germany, have already widely invested in the multimedia market. In fact, they have started co-production agreements with content's producers in the field of educational and cultural CD-ROMs and have developed on-line services for families and children.

In general, the development of Internet services should have an important impact on the educational and training multimedia market and the role of the communication infrastructure providers should be reinforced.

TELEVISION

A few educational or cultural broadcast channels have their own multimedia branch that supplies, often in co-production, CD-ROMs complementing their broadcast programmes. In some countries broadcasters will soon launch digital educational channels, in co-operation with network actors, so as to offer on-line interactive services. The incomes are, however, very low and this is often due to their public utility role. As a result, we have noticed a certain disengagement among some broadcasters, such as for example in France, but also a growing presence on this market as, for example, in the case of Denmark where the role of the multimedia subsidiary of Danish Broadcasting Corporation remains strong. For more details about educational television and new media please refer to Chapter 6 of this report.

4.2 SMALL AND MEDIUM FIRMS

The second group of publishers is composed of small and medium sized firms hailing from different backgrounds. Generally, the income coming from the sales of multimedia products are too low as to allow this activity to become the only one. As a result, multimedia publishing often represents less than 50% of their total activity.

The market shares these companies are heterogeneous and vary according to their investment capacities and the dynamics of their distribution networks.

The weakness of their position in the family market segment greatly restrains their development, as, at the moment, this is the most profitable sector in the multimedia market. We should note, however, that the sales in the educational market are higher in the Nordic countries than in other European countries.

The situation of publishers is easier in these countries and the market is characterised by a strong concentration of a few software houses. In countries such as France or Germany, there is a high number of small companies which produce one or two products and which have difficulties in acquiring adequate information about the market.

At present they are involved in publishing apprenticeship products, targeted and modular taking into account teachers' pedagogical scenarios, for schools and training organisations. Yet, once the equipment and the multimedia practices in schools and training organisms will have reached a critical limit, they will have to target different market sectors. For some firms this scenario could be rapidly satisfied while for others it would take at least three years. On the overall, the position of some publishers could be reinforced if the announced growth in the training for adults at home sector will be confirmed.

THE TRADITIONAL PUBLISHING HOUSES

In all countries, traditional publishing houses have entered the multimedia publishing market, at least in terms of production, and are occupying a strategic position as they have a good knowledge of the school segment and control the editorial contents.

Many of these publishers are actually subsidiaries of media groups such as Havas, Pearson, and Bertelsmann. The strategy of some of them is to progressively integrate the publishing companies into the multimedia production structures they have created when the multimedia for the general public market developed. They also control the distribution networks for schools which in itself can be considered as an important asset even if there is no evidence yet that classical distribution channels are the most effective ones for the multimedia sector.

THE MULTIMEDIA PUBLISHERS

The multimedia constitutes the main activity of these companies both in terms of production and publishing. Some have long ago become specialised in computer assisted education while others have taken a share of the market by developing cultural CD-ROMs. The formers have started developing between 1985 and 1988 especially in countries such as Germany, France, and the United-Kingdom.

Although many of them disappeared between 1992 and 1996, ten years later a great number of them still existed on the market.

During the nineties small companies continued to be created or started to develop multimedia activities for the institutional markets. Such publishers clearly targeted themselves as providers of learning tools for the general or professional fields (mathematics, French, languages, office automation, accountancy...) although some have started to achieve positive results also by targeting the family public or by developing distribution activities.

Multimedia publishers specialised in producing cultural CD-ROMs have started developing between 1992 and 1994, especially in France and Italy and, to a lesser extent, also in other European countries. Although they continue to be very well positioned on the general public market, their profits are not yet sufficient. The need for further investment is a sign of a future reorganisation of this sector and of future media groups' reinforcement.

THE PRODUCERS OF LEARNING MATERIAL

French companies such as Pierron, Jeulin or Deltalab have acquired an important position in the distribution and publishing of EXA² for schools. Their knowledge of the markets as well as their specialisation in scientific subjects should ensure them an important role in future developments. Yet, as for the other publishers operating in the institutional market, the sales in training software are still low. However, a group like Médiasciences -to which Jeulin and Deltalab belong- invests 8% of its turnover in Research and Development and with such a strategy it may become a quite important actor in the coming years.

4.3 THE OTHER ACTORS ON THIS MARKET

The production of pedagogical resources for the vocational training market wouldn't exist without the implication of specialised training bodies.

TRAINING BODIES

In general training bodies produce pedagogical resources for their own use. Some do so in co-operation with professional publishers who might also finance their production in specialised fields. Although this activity is not profit oriented, it allows however to improve the supply of multimedia products in the education/training field which, due to a low level of potential demand, does not allow publishers to take the risk of investing alone.

² Computer assisted experimentation.

With the development of the use of Internet and co-operative work, the position of training bodies on the multimedia market will transform itself or even be reinforced. The appropriation of HTML tools by the trainers together with their expertise as concerns the individualisation of learning paths on the one hand, and the facility of distribution by the Internet on the other hand, could change the scenario on the training market.

With few differences among European countries, this market is not occupied by distance education institutions and publishers, letting training organisations as head actors in this field. And publishers, letting training organisations as lead actors in this field.

UNIVERSITIES

They also produce essentially for their own use. Their heterogeneous production is not well known and not often available on the market. Again as in the case of training bodies, Internet should have important repercussions on University publishing methods. In fact, it could improve the market position of ODL universities' publishing. The role of EC programs is often quite important in Universities publishing.

TRADE ASSOCIATIONS

Some associations or professional bodies invest in the development of products using their own funds, national or European. Like in the case of training bodies, such a production allows to extend the supply of very specialised education/training material, which at present aren't very profitable.

COMPANIES

The training departments of big companies or of some SME networks have developed specific needs. The number of learners they manage is sufficiently important to justify their investment in self-learning and/or at distance training programmes. Some of these products are sometimes commercialised, not so much in view of profit oriented considerations but as a way to acknowledge the expertise of these investors.

TEACHERS' ASSOCIATIONS

These associations produce pedagogical tools in specialised fields such as chemistry, biology, history, etc. and are distributed within schools or sold at a low price. In general publishers have co-production agreements with teachers or trainers. The development of on-line services could however change the role of the latter with respect to the economic circulation and in a certain way implement a collective production process

Finally, we should note that the State also contributes to the production of multimedia training material: it takes initiatives by providing financial aid to support the production and distribution of multimedia learning tools.

Yet, although it has contributed to the development of this market its real contribution is difficult to assess. In a wide number of European countries, the intention expressed by state authorities to integrate ICT in the pedagogical system seems to have provoked a psychological effect on publishers. The activities of institutional resources centres such as CNDP in France or BECTA in the United Kingdom have a relevant impact on the schools market.

4.4 PROFILES AND COUNTRIES

	Denmark	France	Germany	Greece	Italy	Spain	The United Kingdom
European media groups		Yes	Yes	No	Yes		Yes
Book publishers	Widely involved	Widely involved	Widely involved	Minimal activity	Widely involved	Widely involved	Widely involved
Small and medium multimedia publishers	Low number (strong concentration)	High number	High number	Low number	Medium number	Medium number	High number
Production for specific customers	High	High	High	Minimal activity	High	High	High
Multimedia consultants		This activity is often linked with the specific production.	This Activity is often linked with the specific production.	No relevant	Low presence	Low but relevant	A few could have a major impact.
Television	2 channels are widely involved	Educational TV is involved weakly		Minimal activity and prospects	RAI Educational active, but unstable strategic orientation	Educational TV in re-launch phase	The BBC is involved and some other broadcasting are involved in a minor way.
Training bodies	Low	Medium.	Low	Very low	Their production is important but is not commercialised.	Medium	Few of them produce few titles. Some linked to big groups.
ODL organisations	Very low	Very low	Low	Minimal	Very low	Rather low	Low
Universities	Very low (own use)	Low (Internet & own use)	Low	Very low (Internet & own use)	ODL Consortium NETUNO and local initiatives	Starting	Low (own use)
Associations or consortia		Several teachers associations have a thematic production.	Yes	Minimal to none	Minimal	Minimal	2 Colleges consortia and an independent university consortium



**5.
KEY ISSUES FOR MARKET
DEVELOPMENT**



5.1 THE "LIFELONG LEARNER" AS A BUYER OF EDUCATION AND TRAINING MULTIMEDIA

One of the classic interpretation key of the market that MESO is studying is that most of the decision to buy education and training products is not done by the learners (the final user) but by a "prescriptor" (a teacher, an educational authority, the head of a training department, etc.). Consequently, much of the effort done by suppliers to promote their products and services was not directed to (and not designed for) final users, but rather to the "decision makers", the buyers.

The recent stream of policies to support the lifelong learning idea and practice, the accent posed in all recent pedagogical approaches an autonomy of learner, the objective increase of age and educational level of the average learner are all challenging forces to the usual assumption that in most of cases "learners do not decide" to buy education and training products. In most of cases in which a learner is involved in a formal education or training course, she is certainly advised on what learning materials to use, but:

- ♦ the possibility to individualise the learning path usually exists;
- ♦ in many cases users are required to express their opinion on the learning materials that they have been using, and their feed-back is usually considered in view of subsequent purchases.

In addition to this, in most European countries the real growth in the multimedia education market comes from the home segment rather than the institutional education and the corporate training segments. There the young or adult learner is a consumer, with her own criteria for choice and her own sensitivity to price, product and service components, etc..

The ways through which individual learners, and particularly adult learners decide if and what to purchase in the field of learning products is a seldom investigated area. As a result of the discussion on this issue that took place in the MESO^{d2} integration seminar (Bologna, May 1998), a review of two studies on adult learners (respectively in France and the UK) was undertaken. The results of the studies tells us that:

- ♦ the higher the position of a worker, and the higher the qualification already possessed, the more likely that workers will be learners;
- ♦ motivation to learn is still not so widely diffused as supporters of lifelong learning would hope, and that further work is needed to understand how individuals can be persuaded to learn autonomously;
- ♦ efforts should be made to involve the less educated and less qualified individuals in education and training;

- ♦ only a limited part of population may presently correspond to the paradigm of the autonomous learner, who is also able to select among learning opportunities and to buy his own learning products and service.

In spite of these “caveat” and of the dominant opinion, also resulting from the MESO Strategic Watch, that “intermediaries” between suppliers and learners will have an important role for many years to come, the trend towards a more autonomous learner is observable and the North-American market tells us a lot on the tendential “disintermediation” of education and training provision. An effort to understand the education and training multimedia market cannot forget to pay attention to these trends and to investigate learners’ criteria and behaviour when choosing a learning product. Failure to do so may lead, in the medium term perspective, to a failure of institutional education and training systems to adapt their provision to the user requirements and to a progressive marginalisation to those areas in which a formal title or qualification is the only motivation to undertake a learning programme.

5.2 INTERNET DEVELOPMENT AND PEDAGOGICAL MULTIMEDIA MARKET

Connection to Internet by the school establishments has become a priority of the Ministries of Education. This tendency is observable in parallel to a general growth of the number of subscriptions in the whole of the European countries. The predominant observed use of on-line is to provide marketing information; only a few publishers provide additional services to enhance their off-line products. These services are often limited to some after-sale assistance or technical assistance to their users. In a few countries like Sweden for instance, hybrid products such as several types of Internet services like updating, assignment or links are getting popular. Dual delivery mode has become more and more common.

The technical implementation however is only an aspect of the integration of ICT in Education. The development of the pedagogical use of Internet joins the same problematic as concerns the general use of multimedia in Education and Training.

At the moment Internet is used in order to support teaching or for pupil school work, whereas its greatest potential lies in the production of training tools and multimedia contents. The development of on-line services could modify the teachers’ role in the economic circulation and in a certain way implement the collective production process between teachers.

Consequently the teachers could become the principal producers of the tools used for their own teaching. Such a development could all the more be faster because the multimedia publishers' strategies concerning Internet are very limited for the moment (except for some countries).

One can foresee that the development of the multimedia market will be closely linked with Internet development, the current and future scenarios may be described as follows:

DIAGRAM 1

The circulation A is the traditional way of knowledge between teachers and learners. It is currently the main pedagogical model.

The circulation 1 is the current organisation of the educational multimedia market. The main media are the floppy disk and the CD-ROM and the teachers or trainers role is weak, even though some of them contribute to the publishing production. Home users are mainly pupils using multimedia supporting programs, even if sales to adults users grow.

The development of online services, HTML language and diffusion tools to Internet is going to modify the situation, one can note different scenarios.

5. KEY ISSUES FOR MARKET

Diagram 1: current market organisation, online services development is still weak

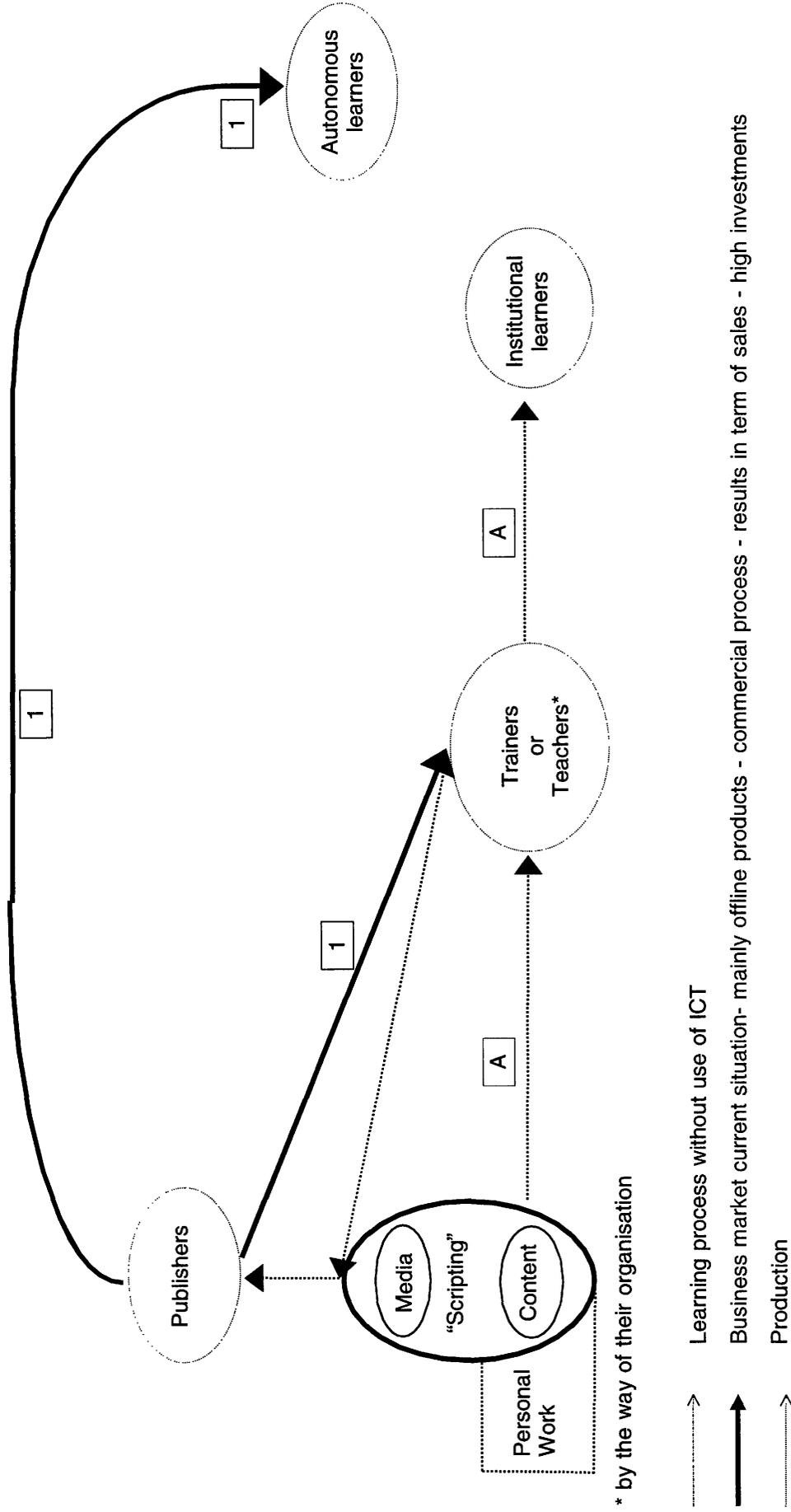


DIAGRAM 2

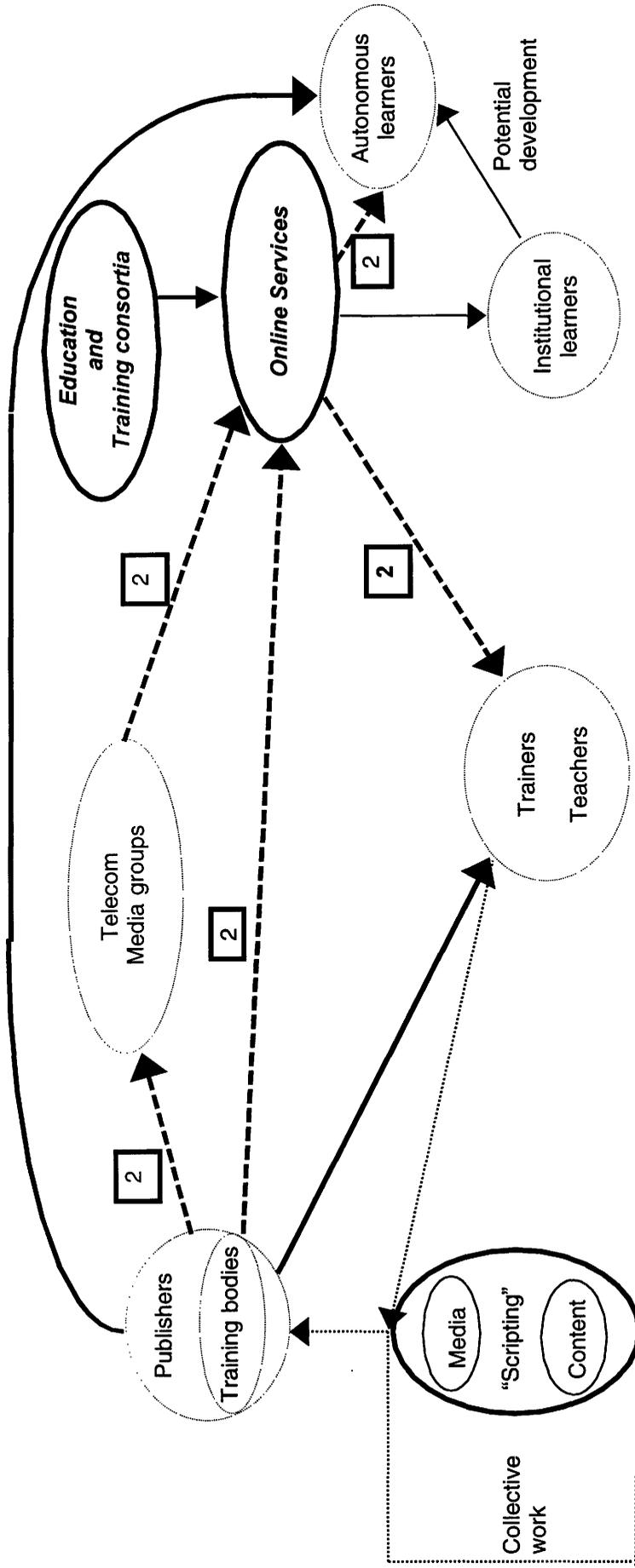
Few offline publishers are going to develop online services and the supply is still weak (circulation 2). At the same time media group and telecom operators, providing communication infrastructure, want to make their investments profitable. As they are interested in the production of the publishers, it could be more efficient for them to acquire interest in some of these companies; in other cases some of them become own content providers.

Insofar as these media companies will reach the institutional learners, we can expect that the integration process of ICT in education and training to be long. (circulation 2).

Another type of content provider may be a non-profit grouping of education or training institutions, which will tend to serve education and training institutions rather than individual learners.

5. KEY ISSUES FOR MARKET

Diagram 2: market development: 1st scenario



- Production
- Business market current situation- commercial process - results in term of sales
- - - - - Business market - potential development- commercial process - results in term of sales

DIAGRAM 3

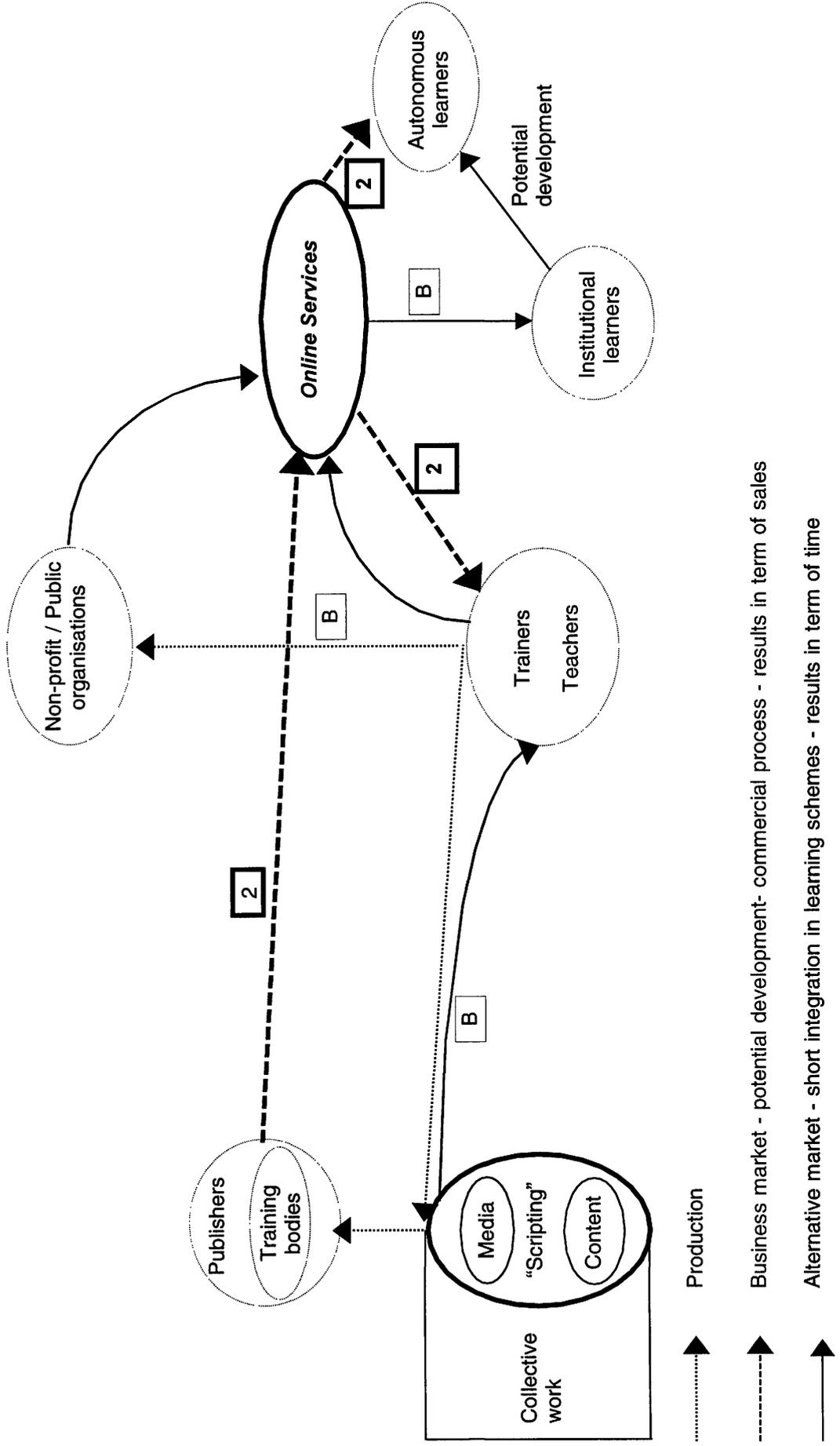
At the opposite (circulation B) trainers and teachers can modify the commercial organisation of the educational multimedia market, providing their appropriate ICT tools. They could produce themselves tools and multimedia contents needed for their pedagogical schemes. This scenario is a collective production process where teachers and trainers are transmitters and receivers. The personal production is impossible and therefore the integration process of ICT in pedagogical schemes could be short.

At the same time, their role in the commercial circulation could be reinforced. It concerns the home learning market which could grow in a early future. Training bodies should develop a commercial supply for home users and not only for their learners, therefore media and telecom companies will not be alone on this segment. Publishers may have the same strategy and may try to reinforce their partnership with trainers or teachers, all the more so because these ones will develop ICT abilities. In the same way, there are also the non-profit or public providers, such as the various School Nets. These public providers mainly serve the institutional market and work closely with teachers and trainers.

The position of the companies on the institutional segment will be all the more strong because the development of the short process (circulation B) will be weak. The other conclusion of a potential development of online learning services is the growth of the autonomous learners. These ones could choose their training providers between telecom operators, publishers to training bodies. The quality level of products supplied in these online schemes will be essential and perhaps a few current publishers will disappear. If training bodies, and not only current online and multimedia companies, firmly establish their position, one will not have to survey the so-called multimedia market anymore but the training and educational market indeed.

5. KEY ISSUES FOR MARKET

Diagram 3: market development: 2nd scenario



5.3 PRICES DYNAMICS

PRICE STRUCTURE AND CONDITIONS ATTACHED

Licence types

A number of different price structures and licence types can be identified. As some producers try to target several market segments, the co-existence of a handful of licence types in one single enterprise is by no means the exception.

Licenses can be based on:

- ♦ A geographical site (site licence, all users under one roof)
- ♦ A legal unit (all users in one legal institution disregarding geography)
- ♦ An electronic unit (all users on one LAN or WAN)
- ♦ Multiple users (x number of simultaneous user)
- ♦ Multiple machines (installed on x number of machines)
- ♦ Number of available units (based on number of machines in a school)
- ♦ Number of potential users (number of students registered at the school)
- ♦ Use (logging, valid for x sessions)
- ♦ Time (valid for x days)

Licences can also be tied to:

- ♦ A specific machine (bundling)
- ♦ A specific user (personal copy)
- ♦ A specific use (for use at the public library to lend out or a demonstration copy)

In addition to these licence types we see discounts for additional copies of a CD-ROM once the main licence has been purchased.

In some cases there may be free updates as part of the original subscription either through the Internet or through the reception of update disks.

The rise in ODL courses will urge producers to contemplate temporary licences or non-stationary licences that are not tied to an individual, geography or a machine. In many cases the educational institution still supply students with software for the courses as they have the tradition of supplying books. These non-stationary licences that arise from this use will be tied to an educational institution instead.

The choice licence structure

There is some evidence that the initial decisions on licensing reflect the dominant culture of the publishing organisation rather than any rational consideration of the needs of the users or the economics of production and marketing. At a more mature stage of market development this tends to change.

Licences based on time seem to be associated with distribution form; normally used on software published and distributed via the Internet. Shareware products often come with a free trial period of 30 to 60 days after which you are supposed to buy the software if you intend to keep using it.

Licence choice can be classified as follows:

- * traditional book publishers may tend to sell software as bundles of 20-25 user licences as this has been the predominant way of selling books to schools (only in those European countries where this applies).

- * Software houses tend to use the site licence approach, as they are aware of the technical difficulty in preventing more installations than the user licence allows and because they are well aware of the widespread practice of copying software on more machines than allowed. Often software producers on the educational market are SMEs with very few employees, which cannot afford the investment in costly procedures to prevent multiple use beyond the licence. The site licence is thus perceived to be a much more manageable pricing structure.

- * Producers that have previously been engaged in video production and distribution, or publishers who are used to sell to individual pupils/students may have a tendency to sell single user licences.

In many countries the site licence (all users under one roof) has been the predominant licence type with educational institutions. However, in some countries the emergence of the CD-ROM as a distribution media made more urgent the need for a single user licence aimed at the educational market.

Because of the many problems arisen from the use of CD-ROM licence, and because of the increase in the number of computers in schools educational publishers have been reconsidering the use of site licence.

Pricing

A number of different strategies are applied when pricing educational software.

Educational software production has long since suffered from a production focus instead of a market focus. This means that CD-ROMs were and in many cases still are priced after the amount of time, money and effort that went into their production.

Producers have tried to charge customers prices that reflect the development costs of a CD-ROM, which has proven again and again impossible. Consumers' arguments for not wanting to pay high sums are among other things that they cannot test the CD-ROM before purchase and that the price of a CD-ROM should match that of a book.

Financial Times report compares the situation to that of the Hollywood movie industry. The time, effort and money put into a film does not reflect in the price of a cinema ticket or in the price of the video once released. The price of both cinema ticket and video is on the level of impulse purchases¹.

However, there are perhaps more sides to the story. Probably the question is whether producers want educational multimedia to be bought by the "prescriptors" only or by the end user to create bulk. When targeting the prescribes the software producer can use much more focussed marketing, can charge more and will not have to worry about the logistics of selling to the home market. So perhaps many publishers of educational multimedia do not feel tempted by the low price/high volume strategy.

Still, a number of actors interviewed for the strategic watch complain that customers are not willing to pay according to the development costs of multimedia CD-ROMs. Even today some report that they are using the mark-up approach to pricing their software.

Price differentiation

Prices can be differentiated according to distribution channel and/or to market segment. Both situations can be observed among the countries investigated for this survey. In the UK price differentiation is done on market segments, with training bodies paying considerably more for software than educational institutions. As mentioned above many small producers have seen price differentiation among school types as an administrative chore that they could do without as thus charge all educational institutions the same.

It is also stated that the price charged for software is related to the retail outlet where it is sold. The two obvious explanations for this are either that the software sold in supermarkets is different from that sold in bookstores or that supermarkets connected to a chain have better opportunities to obtain discounts.

Both arguments are valid. France reports that bookstores are believed to sell quality software and consequently charge higher prices than supermarkets do. In Denmark bookstores and supermarkets do not mention the same success stories, which supports the theory that the software titles sold are not the same or that customers look for different kinds of software in different outlets.

¹ Financial Times, Reaching the Multimedia Market, Rickard and Ertle, 1997.

Also the fact that the perceived acceptable price of a piece of software is considerably higher in bookstores than in supermarkets supports this.

5.4 PRODUCTION PROCESS

CRITICAL ISSUES IN THE PRODUCTION OF EDUCATIONAL MULTIMEDIA SOFTWARE²

The Missing Paradigm

The EMS production is in search of paradigm that will guide the involved organisations. As of now such a successful paradigm seems to be missing both in research and in practice.

There are four relating paradigms which nevertheless fall short of the particular requirements present in EMS production:

- ◆ **The Book Publishing paradigm.** In this paradigm an author - usually a single individual - is responsible for furnishing the content. The content is text possibly accompanied at certain points with images. The development of the story follows rules tested over thousands of years. In order to produce EMS, a team should be required in place of an individual author, *comprising*: subject experts, HCI experts, instruction experts, creative authors, conversant in the subject matter, in tune with its didactic requirements and the possibilities of the EMS technologies, a design manager. Traditional publishers are inexperienced in bringing together, supporting and managing such teams. Thus the book publishing paradigm falls short.
- ◆ **The Film production paradigm** While the film production is concerned with visualisation of content in a linear fashion, EMS is mostly concerned with creating interactive learning experiences through the use of multimedia software technology (e.g., multimedia databases, simulations, explorable environments etc). Thus the film production paradigm is too simple to accommodate the design complexities of the new product.

²

The term «Educational Multimedia Software» will be referred in the text as EMS

- ◆ **The Traditional Software Development Paradigm** Traditional software development - e.g., the type of software that is used in banks, airline reservation systems etc. - use analysts to define the manual work and the related information flows in the physical system and then design around it the computer system that will automate and possibly simplify the processes. The problem with EMS is that the processes under study are not physical, but mental, cognitive. Evidently the complexity of understanding these processes, let alone intervene in them leaves the traditional software development paradigm short of the task.
- ◆ **The Software Game Development Paradigm** Game software has in common with EMS the creative development of interactive environments and the design of user experiences in them. However the Game Software does not necessitate the extremely demanding task of understanding deeply a knowledge subject and the types of learning difficulties faced by the particular user group on the one hand and having the creativity to generate an interactive environment that deals effectively with these difficulties. Thus this paradigm is lacking as well

What the EMS industry is after is a new paradigm that we will call **Learning re-engineering paradigm**. This is a model that conditions the EMS developers to re-engineer the way a particular type of user - characterised by particular cognitive, affective profiles - approaches a particular type of subject matter. Instrumental in this effort is the presence in the project team and the effective co-ordination of the factors of design that were enumerated above.

Critical issues for the development of production processes

1. Patent Protection and intellectual rights

To motivate creative individuals to invest money and effort in thinking new better ways to do things, societies have established the right to protect their ideas through patents. Still in the EMS industry the ability of a designer to protect one's idea of a new way to learn say vibrations is much in doubt. It is our conviction that this represents in the long-run a serious threat to the industry, depressing its innovative creativity and deterring talent from investing in it.

As for the intellectual rights issue, the EMS industry faces tremendous hurdles in dealing with the intellectual rights of its inputs: unless electronic commerce applications in the form of Multimedia Rights Clearance Systems enable the time.

2. The rapid obsolescence of the technologies and knowledge assets

The productive assets of an EMS developer have a technological and economical life that hardly surpasses the 18 months. This is a factor deterring new investment by increasing the risk and the amount of the required investment at the same time.

A similar effect is felt in the knowledge assets accumulated by the organisation. Programmers, multimedia designers etc have to re-educate themselves regularly in the new platforms, languages, authoring tools that represent the latest standard.

3. The scarcity of the specialised Human Resources

Not only the specialised skills required for effective EMS design are extremely scarce in the labour market but also there is lack of educational and research activity to balance this inequilibrium.

There are few prestigious Universities offering high quality courses and organising ground breaking research on subjects crucial to the quality of EMS development. For example, an important issue is how to use EMS to foster learning in particular subjects. This treatment necessitates the breaking down of traditional walls between University departments, i.e. the collaboration of computer scientists with psychologists/instruction engineers and subject experts, which in itself is contrary to the existing University cultures and structures.

4. The Lack of Scale

Because EMS development is a complex activity it requires large teams that add to the fixed costs of the producing organisation. Such costs cannot be endured unless a large profitable market justifies it. In a micro-level we can not expect individuals to invest their talents, time and money in cultivating the type of skills and knowledge required unless there is sufficient breath and depth in the market to assure long-term, continuous and profitable employment.

5. The Education of the Consumer

The consumer - the learner/teacher - is in general unaccustomed to learning and teaching with the use of EMS. The education of the consumer - both learner and teacher - is a gigantic task that certainly can not be carried on the weak shoulders of the industry. This is a long term process that has to be channelled through the educational and training institutions and actively supported by the national governments and the EC, since this is a very critical factor with a strong impact on production processes.

6. The Growing Importance of the Internet

Internet is becoming increasingly important as a potential publishing medium and marketing tool for EMS. This is a trend that is universal in software development. Indeed at this stage the industry has not developed business models that would enable them to migrate to Internet platforms. Still large companies are keeping a steady eye at the WWW and smaller players are destined to follow. For example, The Learning Company which recently acquired Broderbund announced its strategy to develop EMS for use over the Internet.

The Internet not only may solve the extremely complicated distribution problem, easing the difficulty of finding «shelf space», but may also enable the sampling of EMS and thus greatly enhance its differentiation and profitability. Furthermore the “disintermediation” would increase the scale and scope of the markets as a result of price elasticity, easy accessibility and a single currency.

7. The Trend towards outsourcing and public-private co-operation

As in other sectors - ranging from system software development to manufacturing - a trend towards decoupling design from implementation/production occurs.

This trend envelops EMS development as well: in the future we shall see the software implementation - the actual programming of Java or some EMS authoring tool - to be pushed Eastwards. The role of Internet will become crucial in this outsourcing process.

Public institutions and especially Universities and Training Organisations have been the pillars of education for ages. In the future their role will be deepened and expanded and their outwardness enhanced. Co-operation between the Industries and the Universities will increase, the need is already felt by both sides.

The EMS industry will have to capitalise on the development of public private co-operation which is now at its initial stage and unite its forces with the resources that are available in the Public sector in ways that will be mutually beneficial. Such patterns are already visible in many national environments although in a small scale.

8. The trend towards a “Service Product”

The need of learners for on-going support, the network centred paradigms of the information technology and the need to differentiate and augment the product offering's value will push the industry towards service components. These components will become more and more important as the Internet penetration and bandwidth increases.

5.5 STRATEGIC ALLIANCES, MERGERS AND ACQUISITIONS

The structure of the European multimedia industry used to be described as fragmented and mainly composed of small producers and a multi-faceted number of different categories of suppliers. Large groups were present in this market already in the past years, but with a rather exploratory attitude, usually with small subsidiaries and without investing too much.

Due to this situation the supply-side of the market and the related capacity of investment tended to be described as weak. On top of this, the lack of information on the market and the inherent turbulence made it difficult to foresee the future of an individual product although the market as such was certainly growing.

Given as granted that the educational multimedia market was characterised by a low concentration of the companies therein operating, the temptation to establish alliances on the supply side of the market was even too obvious. In fact many alliances and mergers have been established in the latest years.

Generally speaking, there is evidence that three are the main reasons which may bring about the need for alliances:

- ♦ to strengthen the capacity of investment in products, services and distribution, and the related possibility of coping with problems of market size and uncertain revenue.
- ♦ to increase access to distribution (national and international Market).
- ♦ to rationalise the production and the delivery of value added services in order to better respond to changing user requirements.

A list of some examples of strategic alliances as a possible way to overcome this structural weakness, is outlined below. Some examples relate to vertical integration among producers and distributors (or producers and users), some relate to horizontal integration among producers or distributors.

- ♦ **Publisher with publisher**, characterised by a co-investment of several producers and publishers in order to be able to lead ambitious projects (i.e.: the alliance of “Montparnasse Multimédia” with Réunion des Musées Nationaux” which was built to produce and publish CD-ROM covering a large cultural market.
- ♦ **Distributor (publisher) with several other publishers**, characterised by a Distributor (who is, in turn, a publisher) grouping the catalogues of several publishers into a whole catalogue for a specific market and offering after-sale services (i.e.: Jeulin, Jérico).

- ◆ **Network with publisher**, an incorporation of small publishers into a network operator to be able to deliver higher value services which are nearer to the end user needs (vertical integration from products to on line training services); i.e.: France telecom, Siemens, Nixdorf).
- ◆ **Distributor with distributor**, in this kind of alliance publishers having access to a wide market or to the home market decide to add a different distribution channel through a partnership; i.e.: INFONIE & LA CINQUIEME where the latter extends the broadcast diffusion of its contents through an on-line service, which can be accessed by the INFONIE service as well.
- ◆ **Generic retailer/service provider with educational publisher**, that is Retailer/service provider incorporating education services in their services (Example: CUC, American retailer using post and Internet to serve his 80 millions of clients. It is ready to propose multimedia learning materials in a first stage and, in a second stage training services. His experience of commercialisation of travels, holidays as well as products will be transferred to this new market).
- ◆ **Publisher with user groups**, Publishers co-operate with the target group of the final product, to involve them in a process of up-grading and adaptation of the product itself (Examples: EVARISTE, ODIN).

As general conclusion to what illustrated above we can say that very few of the alliances described had an international nature.

In the suppliers' perspective, the market still keeps a national dimension and a strong trend towards the internationalisation of the market itself has not come yet into play.

In order to overcome this obstacle to internationalisation of production, especially in the education sector, a series of European Programmes have been launched supporting the establishment of transnational partnerships, especially in the training and academic field. From the production side, the number of multinational producers is increasing in order to enter markets which have not reached their saturation point yet.

What happened in the last year allows us to say that some of those expectations were correct: a great volume of mergers and acquisitions have characterised the market in the most recent period, and large media groups have often been the engine of these developments.

In fact, a shift of strategy seems to have occurred: if in the past large groups used to set up a small subsidiary and try to improve (not always with success) their brand on the new specialised supply, now the trend seems to be rather the acquisition of successful specialised companies in several national markets.

The latter approach seems to produce acceptable results, anyhow better than those achieved previously. This is mainly due to the fact that local specialised companies have a much better knowledge of education and training markets and an established relationship with the users in these segments, that was usually not the case for the major companies' new subsidiaries.

Also the impact of European Programmes on the establishment of large transnational consortia of universities, major training organisations, educational authorities and training services must not be underestimated.

Though not yet macroscopic in terms of market share, these new forms of collaboration are changing attitudes in large sectors of potential users and are testing new modes of delivery that usually bring significant learning-specific value-added to multimedia and telematic applications thanks to the direct involvement of user representatives and E & T specialists in those consortia and related projects.

The combination of these two forces (shift in strategy of major corporations and emergence of large European consortia of user-related organisations thanks to European Programmes) is progressively changing the two characterising factor of the supply: the capacity to invest of suppliers is rapidly increasing and the number of international alliances, mergers and acquisitions is rapidly growing.

5.6 PUBLIC POLICIES AND MARKET DEVELOPMENT

PUBLIC POLICIES

Public policies for educational multimedia differ substantially between the various countries reviewed. At the same time they show some structural similarities.

Differences in public policies can be grouped into three main dimensions:

- ◆ Starting date of a reasonable public policy on educational multimedia/learning technology;
- ◆ Degree of embedding into a general ICT countries development policy and internal coherence of different national policies;
- ◆ Priority level of educational use of ICT.

Starting date

As shown by the data contained in the MESO Collection of National Synthesis Reports 1998, we can identify three main trends: a group of countries like Denmark, Finland, Norway, Sweden, the UK, (with some limitations the Netherlands) in Europe and specifically Canada outside Europe which started a coherent “ICT in education” policy already in the Seventies; a second group starting a more or less coherent policy at the end of the Eighties like the US in the preparatory phase of the “National Information Initiative” and a group of European countries following the beginning educational ICT policy of the European Union starting about 1985, like France, Spain, partly Italy. A third relatively recent time frame with a public policy in the field starting between ‘95 and ‘97 contains countries in Central and Eastern Europe after the opening, in many cases following initiatives and frameworks offered by European Union programmes as well as EU-members like Greece and Austria, Germany on the Federal level (with slightly pre-running policy initiatives in some states).

A last group is formed by countries, where no coherent public policy in the area exists, but where increasingly initiatives can be identified with a perspective to converge in the near future towards a coherent educational multimedia policy. This case is typically described for Japan.

While early policies mostly start in (and are limited to) the educational area, public policies in most countries show a strong tendency of getting incorporated into a general national policy, developing the use of ICT or even more general national policy coping with technology and society development in total, including the challenges of globalisation.

Especially in the “early” countries like in Scandinavia or Canada educational technology policies had been partly for-runners of the formulation of a national ICT-policy, where in most of the “later” countries a educational technology policy was first coherently formulated within the process of setting up general national plans. In most of these cases educational issues had been highlighted as the most important ones, creating the knowledge and attitude infrastructure for all other areas of application (e.g. NII in the US).

Embedding into general policies

Public policies may be classified according to the priority given to educational issues within a comprehensive national strategy. In some countries there is a clear political lead for educational aspects like in the UK, specifically under the new government, in Canada, the US and now in France and Italy.

In most of the countries educational policy priorities have been set very high without the outstanding position in the countries mentioned. Other countries give educational issues a role amongst others, which in practical terms mostly is mirrored in budget allocations to the educational field substantially lower than to other areas (e.g. Japan).

Coherence

Third dimension of differences seems to be the coherence of public policies for educational multimedia use within a country. Typically different ministries are involved: those for Education in general (in some countries divided into the School and the Higher Education sector, for Research, for Labour and Vocational Qualification, for Economy, partly for Industry and (where existing) Post and Telecommunication or for a Language area or the Cultural Heritage.

Some countries show a high degree of coherence between the different ministries and their associated bodies, mostly with a clear definition of a "Lead-Ministry" (like e.g. "Department of Education and Employment" in the UK), whereas in other countries a diversity of partly competing policies can be observed. Co-ordination between different ministries and bodies with the result of a coherent political framework seems to exist, but is rather an exception, and therefore incoherent policies are most likely to result.

A second aspect of coherence can be found on the dimension centralisation vs. regionalisation. Some countries show by traditions of their political and educational system from the beginning a dominating regional element (like Canada, the US, Germany). Other countries do keep a "top-down" centralised approach, but with increasing importance of regional interpretations. This regional shift seems to have a specific importance in countries like Spain and Italy.

Only a small number of countries follow predominantly a centralised approach, amongst them some of the small countries, where the "critical mass" for many aspects of multimedia use in education can only be reached on national level or even requires a bigger population (the most typical example are the Nordic Countries). One of the few big countries still following a pure centralised approach seems to be Japan.

COMMUNALITIES

While public policies in the field differ in all of the three dimensions described and in consequence form a differentiated pattern with clear national particularities in almost all cases, one strong structural similarity can be observed: the phasing of policies, means a more or less common development process running through different phases.

Supply-Centred

Almost generally public policies towards ICT derive from the awareness of both: a lack of suitable hardware or technical infrastructures and a lack of adequate software/educational applications. The usual solution is to support the availability of hardware/infrastructures and/or software/content structures.

In some countries priority is given to the hardware/network infrastructure supply. In a smaller number (specifically in the past, e.g. France) priority was given to financial support/funding of software/content development. Most countries support in this phase both areas with varying emphasis.

In the initial phase, investments in software development depends totally on public funding, because those publicly funded software usually is given to schools and other educational institutions for free. So there is no more chance for private investors for a return of investment. Only when public money is withdrawn from direct investment in software development and converted into more market-compatible forms of support (e.g. granted budgets for selling specific types of products, private public co-production) industry investors are willing to enter the market.

The development is less clear, but also evident in the case of hardware and networks. At the beginning public bodies usually expect industry to supply the educational sector for free or at highly subsidised prices with hardware and standard/operation software needed. Due to the profit making objective of the respective companies, this policy only works at the very beginning, when in pilot applications only a marginal part of the educational community is supplied and where these pilot applications can be expected to have a strong marketing function for a broad scale supply of the whole educational community

Where public policies only once allocate even big public funds for buying in hardware this also does not create a real market, as long as no perspective for continuous supply exists.

A policy creating a framework for such a continuous demand and supply of hardware and network structures for the whole educational field need much more than the singular allocation of a specific amount of money.

It has to create a new structure for educational budgets, shifting a reasonable part of educational expenses permanently towards ICT supply, which usually means to distract expenses from other areas (e.g. personal costs for teachers) or to allocate permanently additional funds from other areas for educational purposes.

Such a structural shift in budget allocation has been achieved only in very few countries and even there only for parts of the educational system.

Substantially, a shift towards a more long-term oriented development policy is needed in order to foster a balanced increase of ICT in education.

Market-Oriented

Public policy, having experienced as described the problems of the “supply-oriented phase” usually progresses towards a “market-oriented phase”, where the different actors are put into focus, analysed according to their interest and where policy tries to create favourable conditions for those actors to develop activities regarded as useful.

Typical mechanisms for that phase of policies are different forms of a “public-private-partnerships” and/or partnerships between different non-commercial institutions and actors (e.g. public broadcasters, schools and universities, professional bodies, regional/local authorities and associations, parent’s organisations etc.). Result of this phase of public policy is usually a rich and sophisticated landscape of new types of entities like associations, task forces, development councils, all other types of co-ordinating bodies.

As a result of this policy phase, we find specifically in countries with a longer policy tradition in the educational field stable institutions and functionalities whereas in other countries those structuring and market-transparency processes have just started.

Infrastructure Oriented

Public policies in the field with a longer lasting successful tradition tend to shift their emphasis towards creation and support of long-lasting infrastructures for the proper use of educational multimedia. Mostly those policies are centred around training of teachers and trainers and the qualification of policy makers and administrators of all levels. Those policies also care about recognition of educational results gained completely or (to a big extend) by educational multimedia use and centre around the definition of the role and the importance of educational multimedia within the educational community as a whole.

MARKET DEVELOPMENT

Long-term Coherence

Long-term political work is needed to support the creation of a mature educational multimedia market. To have a good chance for a successful creation of an educational multimedia market, public policies in the field have to succeed in finding a recognised permanent role in the whole framework of public policies.

Adequate "Phasing"

Although the "supply-oriented policy" is not optimal; the fact that almost all countries have started with this kind of approach suggests that such an initial supply-oriented policy phase is necessary to start certain developments, probably with a main effect of creating broader scale awareness by a relatively quick uptake of a limited number of pilot implementations.

After a relatively short initial "supply-oriented period" policy has to shift to a "market-oriented phase". Following our observations in no case a pure supply-oriented policy was able to create a working market for educational multimedia. As objectives and methods of such a market are sophisticated and difficult to implement, this phase usually needs a longer period of coherent actions.

Countries with difficulties in the development are sometimes characterised by a too long phase centred on "supply support" or/and no sufficient continuity in the policy of market support (e.g. France, Germany) whereas countries with highly developed markets (e.g. Canada, Denmark) are characterised by a longer period of stable policies of the "market-oriented" phase.

Relation between Technologies and Education

A real key factor seems to be the cultural relation between technologies and education in different national settings. Where we find general attitudes amongst the actors of the educational community, which are distanced or even hostile towards technology, markets are less developed than we may assume based on the technology level we find in that country. Public policies for a promotion of educational multimedia use address this topic to a different extent. "Young" policies usually concentrate on the small number of technology enthusiasts existing in each educational community. In consequence their effects are limited to that subset of actors in the field.

CONCLUSIONS

Public policies not only seem to be indispensable for the development of a self-sustaining and self-developing educational multimedia market. They seem to have the biggest impact on the pace and the success with which such a market develops.

Successful public policies need to have a long-term continuity, to create a consensus or a well working co-ordination of different national actors, to establish forms of collaboration in the development of policy formulation and its implementation, which is adequate to the traditional decision structures within a given country (central-regional) and are able to cope with the shifts of these levels of responsibility as it can be foreseen in the respective country; they have to progress in time from an initial “supply-oriented” to a “market-oriented” and finally to a “infrastructure-oriented” phase; they have to stress pedagogical broadscale objectives and actively try to contribute to the creation of an educational culture, which adapts technology use as a tool for a creative structural development of the educational community.

The importance of those policies can be estimated when we analyse the quite reasonable differences in market maturity between countries with a comparable economic and ICT technology background. On the one hand adequate and consistent public policies to promote educational multimedia have obviously the potential to raise a national market substantially over the nation’s technology baseline. On the other hand missing, incoherent, delayed public policies or those not adequate for the existing structures and the cultural background may substantially delay the maturation of an educational multimedia market in a country.



6. MARKET FORECAST



INTRODUCTION

This chapter intends to give a general picture of the possible future scenarios regarding the MM market development in Europe. We will first of all summarise the predictions made by the experts contacted for the Delphi Forecast Survey and integrate them with further information available in the Strategic Watch and other MESO sources. To make our market forecast as complete as possible, we will also analyse the market predictions made by other studies.

6.1 MESO DELPHI FORECAST SURVEY

In the framework of the MESO study, a Delphi Forecast Survey has been conducted in order to identify future scenarios of the European multimedia market. Experts across Europe have been interviewed in two rounds on the following key issues:

- ◆ **Supportive technology for the diffusion of multimedia educational software**

The opinion of experts has been asked on future trends in the use of different technologies that support the diffusion of multimedia software in the education, training and home sectors. Assessing the degree of technological penetration in these sectors is quite relevant as it gives an idea of the potential environments in which educational multimedia software can be used.

As for **the education sector**, experts agree on the fact that by the year 2005 Universities will be, in relative terms, the greatest users of multimedia technologies, but the highest increase in terms of market development will be registered in primary and lower secondary schools. According to the Delphi Survey, the number of schools using PCs, PCs with CD-ROM driver and MM computers should have a 50% increase between the year 2000 and 2005. Thus, this sub-segment should represent the most interesting target for multimedia suppliers.

Intranet and ISDN connections are expected to double both in lower and upper secondary schools.

As for libraries and museums, the most striking figures regard again ISDN connections which should register a growth of almost 30 percentage points. The increase of the degree of technological penetration in this sub-segment is to be considered crucial, since in public libraries and museums all social groups can equally benefit from using ICT technologies.

With regard to the training sector, training providers, large companies and SMEs (10-500 employees) have been considered.

While there seems to be some convergence between large companies and SMEs as far as hardware equipment is concerned, a diverging trend is to be signalled in the networking area, i.e. Intranet and ISDN connections. In fact, according to our answers, while 80% of large enterprises, 72% SMEs with 100-500 employees and 56% SMEs with 10-100 employees are expected to have PCs by the year 2000, the situation is quite different for Intranet and ISDN connection. 43% of large enterprises are expected to have Intranet services by the year 2000 (a percentage which will rise in the following years to a potential 70% by the year 2005), while only 27% of SMEs with between 100-500 employees are expected to have Intranet services and even less for smaller SMEs with an expected 17% .

In sum, large companies with a high number of employees tend to purchase a wider range of MM products and services than smaller organisations. Our findings suggest that the degree of technological penetration and use of MM products and services varies according to the size of the company (in terms of employees).

The size of the home market in terms of PCs with CD-ROM, Multimedia PCs and Internet connection is expected to significantly grow between the year 2000 and 2005. For example by the year 2000, 38% households are expected to use Multimedia PCs while by the year 2005 this figure is expected to increase reaching 63% of households.

The drastical increase of networking is also to be pinpointed: households with such connections will more than double in the case of Intranet and ISDN connections, and increase by 24% in the case of Internet. This is a significant trend, although these values remain quite low in absolute terms.

◆ **Degree of market development**

While for the moment the degree of market development reached by European countries shows a gap between North and South (see the Market Overview section), experts are quite optimistic about the situation in year 2005: as a matter of fact, their predictions suggest a high overall estimate of the degree of market development (very high penetration of technology, presence of a satisfactory number of suppliers, high use of ICT in E&T, high availability of information on supply, existence of consolidated market prices). If at a first sight these predictions might not seem realistic, it should be reminded that the ICT market as a whole is characterised by a high and fast growth rate: in Italy, for instance, the first semester of 1998 has been characterised by an increase of 9% in ICT market (with respect to the first semester of 1997), reaching a value of about 20 MECU (Assinform, 1998).

♦ **Types of multimedia software**

In the overall, an increase in industrial products is foreseen, while bespoke professional products for a specific customer will almost remain unchanged. A decrease will be instead registered in amateur products.

In general terms, the multimedia market for education and training will be service-led; as a matter of fact, products will still be relevant, but to a lesser extent than services.

Product and Service components	2000	2005
Products	40%	38.8%
Services	60%	61.2%

♦ **Suppliers' market share**

Major companies are expected to have 50% of market share in 2005 compared to the 43% of 2000; SMEs a 31% market share in 2005 compared to a 34% of 2000, whereas institutional or non profit suppliers are only foreseen to have a 19% of the market share of MM education and training in 2005 compared to the 24% of 2000.

In particular, within each of the three main categories the following aspects deserve special consideration:

- ♦ within major companies, the subsidiaries of American media groups are expected to grow faster and to strengthen a dominating market position already existing in 2000; major telecom companies are not expected to grow much, less than broadcasters and much less than on-line providers, that will register the highest growth rate, although starting from a modest market share;
- ♦ within the category of SMEs only specialised MM producers are expected to grow, while other providers are all expected to see a decrease in their market share (that might well correspond to an increase of absolute turnover in a fast growing market);
- ♦ within the institutional and non-profit suppliers, all groups are expected to decrease their market share, but training bodies are predicted to resist better because of their strong rooting in their market niche and relatively easier access to public funding for development of learning materials.

6.2 STRATEGIC WATCH AND OTHER MESO SOURCES

In the framework of the **Strategic Watch**, a representative group of key suppliers and distributors has been interviewed in order to provide a description of the companies involved in the production of educational multimedia and to analyse their market strategies. In particular, questions were aimed at investigating on key actors' opinions about the supporting role of national and trans-national policies together with public/private and private/private national and international initiatives for the development of multimedia market and at analysing multimedia market dynamics and the expected future development of on-line and off-line multimedia tools.

As for the first issue, the role of the state is considered as crucial as far as the diffusion of ICT technologies is concerned; in the key actors' opinion a greater use of new technologies in schools will be achieved by increasing the number of agreements between the public sector and private firms. The final aim of national policies, particularly as far as southern European countries are concerned, should be that of fostering an homogeneous distribution of hardware and multimedia tools in the educational sector.

As for the role of international institutions, the European Commission is seen as a strategic actor in the development of the MM market. Its role in fostering a greater awareness of the educational value of ICT technologies and its financial support in this direction have been highly praised and have received very favourable comments. Yet, precisely because it has been one of the most active promoters in this field, it is expected to take further and more concrete action in the near future. According to our interviewees, the Commission should implement programmes which induce national governments to actively support the development of the MM market, especially in the educational sector. In addition, the EC should support R&D on emerging technologies and influence the development of multimedia materials in a wider range of languages in order to knock down linguistic barriers which represent one of the main impediments to the growth of a European multimedia and multicultural industry.

With regard to market dynamics, and to the expected future development of on-line and off-line multimedia tools, MM market seems to be moving towards a high volume-low price situation, at least in the home sector, while the education sector undergoes different situations, according to the country analysed and provides better results in countries with a long tradition of public intervention in supporting MM applications in schools and in favouring a wide penetration of technologies. As for the training sector, experts agree on the fact that this trend does not apply to management and personnel development topics.

It is interesting to note that publishers have started adopting a new production strategy focussing on the final user and elaborating programmes that are intended for the "autonomous learner". Such products include updating, self-training and self-testing one's own skills tools.

As concerns multimedia products and services, most interviewees believe that the market is undergoing a positive trend but further support should come from national governments as far as the use of Internet, Intranet, CD-ROMs and hybrid tools is concerned. Public policies should lower taxes for educational and training products purchased by teachers and families so as to ensure a greater availability of PCs and/or other learning tools at home. Although, in general, Internet, Intranet and CD-ROMs will experience a further increase in terms of market development, it should be stressed that eventually CD-ROMs sales will become stable showing a low rate of growth. Internet and Intranet are likely to grow as the cost: bandwidth equation becomes more favourable. Hybrid products are instead slowly growing as CD-ROMs slow down this process. With respect to the use of these new products/services, it must be said that up to now the Internet has been used prevalently as a means of commercialisation. Concerning prices, CD-ROMs are already experiencing a high volume- low price situation for edutainment and entertainment subjects, while reference products are still going to be produced in relatively moderate quantities and high prices. In Italy for example the price of the former is three times less than the latter.

Among the other studies analysed, the **Datamonitor Survey 1997** provides interesting information on the development of the educational, training and home sector.

As for the education sector, it will cover a relevant share of the multimedia market thanks to the increasing initiatives aiming at fostering its development both at national and trans-national level: according to Datamonitor estimates, European MM expenditure in the educational market will double between 1997 and 2002.

With regard to the corporate sector, it will be, especially in the UK but much less in Italy and France, the largest sector investing in MM training and, according to Datamonitor, it will represent an important target of suppliers. It is estimated to have an average growth rate of around 60% between 1997 and 2002. This growth in size may be attributed to the increased penetration of multimedia PCs and Intranet and to the need to provide employees with continuous training (Datamonitor Survey, 1, 1997). As business culture changes and companies are increasingly exposed to market globalisation and international competition, MM training is perceived as the most suitable tool to cope with the need for a flexible and up to date workforce.

The consumer sector is characterised by a vast potential market size due to the increase of PC endowment in households and to a growing demand for edutainment products and reference tools. In a sense, the consumer and the educational sectors are closely linked since an increase of educational programmes in schools fosters a greater demand among parents and students at home and viceversa a greater penetration of technology in the households can higher the educational MM market in schools.

With regard to multimedia products and services, on-line services are expected to grow ; in particular, Internet and Intranet applications are expected to have a growth boom between 1998 and 1999, and to have an overall increasing trend in comparison with standalone applications.

6.3 CONCLUSIONS

Although the multimedia European market shows a positively increasing trend, the European picture cannot be defined as homogeneous yet in spite of the existence of convergence signs among northern and southern European countries.

If on one side experts agree on the fact that political national and trans-national initiatives have fostered the transfer of innovation (hardware endowment and infrastructure creation), and thus contributed to the narrowing of the existing gap, on the other side their main preoccupation is that this change might only be occurring as far as the endowment of technologies is concerned, whereas basic remains the establishment of a strong infrastructure. Moreover, and according to the results of our MESO Report, convergence might be interpreted not so much in terms of convergence between countries, but between sectors; for instance, Universities across Europe have a tendency to reduce the existing gap at a European level. It should also be noted that because the market is changing also the boundaries between these segments are slowly evolving.

A quite important result of our Delphi Survey is the prediction that services will remain predominant over products in the MM market for education and training. This confirms our MESO forecast on the development of these market segments and it implies that companies which are already offering training and educational services will become increasingly competitive. In addition, the impressive growth of on-line services over standalone products should be pinpointed.

As for the distribution of market shares among different providers, a quite interesting result is given by the Delphi Survey, according to which major companies are estimated to have a 60.2% of the market share in the year 2005, SMEs are expected to have a 34.2% share, whereas institutional or non-profit suppliers should have a 21.8% of the market share of MM education and training.

The effective future development of the MM market will depend on a number of factors, especially as far as the education sector is concerned. In particular, according to our Strategic Watch, only a constant support on behalf of the State and the existence of agreements between the public and the private sectors will foster the growth of the MM market. In this respect, the European Commission is expected to encourage and promote co-ordination of national programmes intended to develop the use of multimedia within the educational system.

7. CONCLUSIONS

From all the activities we have conducted within the MESO project, the following seem to be the main conclusions.

MARKET DEVELOPMENT, SUPPLIERS AND TECHNOLOGY

1. A differentiated continent with some convergence among countries

Europe is not a homogeneous continent as far as the use of ICT in education and training is concerned and, as a whole, is not so advanced as other leading countries such as the USA, Canada and Australia. Differences among European countries are still macroscopic, but both compensating differentials in market growth and a significant convergence of national public policies (at least in the education sector) may induce to believe that distances between the most advanced (UK and Northern Europe) and the less advanced (Southern Europe) countries in this area are going to be reduced in the next years. This is not, however, an uncontroversial conclusion because the signs of stronger growth in technology penetration in Southern Europe might not be accompanied by corresponding growth in use and good practice.

2. Growth in quantity and quality of products and services

A substantial progress in quantity and quality of supply of multimedia products and services for education and training has taken place in the last two-three years. The explosion of Internet use (in organisations and at home) and the significant growth of CD-ROM market (especially at home) are the two basic conditions, on the technology infrastructure side, that support the market growth.

New categories of actors are increasing their presence in the education and training business thanks to the increase of the product component into what was mainly (and still, to a large extent, is) a service market.

The quality of multimedia products has improved substantially in the last two years, moving from what was not a satisfactory level, which justified negative attitudes developed in the past by users and intermediaries (teachers, training managers, etc.). New forms of user-based quality review are emerging in some countries and are a sign of incipient market maturity.

3. Trend towards price decrease, however not generalised

The multimedia E&T market seems to be moving from a situation characterised by high prices and low volume of production to a situation characterised by lower prices and higher volume of production. Within this process “quality” becomes a key-issue: once multimedia products and services become widely used, the risks brought about by mass production become higher. A risk of possible reduction of quality when the market size increases is perceived by several observers (suppliers and policy makers), but higher volume of production does not necessarily mean lower quality. A re-engineering of the production process in view of a more industrialised approach may lead to the adoption of more mature quality approaches that may accompany lower production cost and lower prices.

It is to be noted, however, that the tendency towards price reduction is not generalised: if it can be observed rather easily in the home segment, the situation is more multi-faceted in the education and training sectors, where institutional presence and different degrees of integration of service and product components, and an evolution of the licence sales practice may bring to very different results in terms of prices.

4. A multi-domestic market with limited but growing transfer of products across countries

It cannot be said that a real European market exists, but rather a multi-domestic market, in which the national dimension is by far prevailing (with the heavy consequences that this may have on suppliers of smaller countries), but some level of import/export/international collaboration is taking place, especially in some specialised or high qualification areas.

The multimedia educational market continues to be a national one, but the number of transnational partnerships and licence agreements is starting to grow rather quickly, that was not the case in the previous years. This dynamic will not generate a European market in the near future, but it shows that providers are increasingly inclined to move into the international market in order to overcome the limits of a small national audience. Many of the export developments, however, are directed out of the European Union, especially for those producers based in countries that can count on a significant language and cultural area outside European Union.

European cultural differences are still seen more a barrier to export/import rather a richness that can be used to develop multicultural learning resources.

5. A rather fragmented supply, with new trends

towards concentration

In the majority of European countries, the educational multimedia market is composed of many small structures operating alongside to some big players, among which the subsidiaries of large publishers, telecom companies and software companies play an important role.

The advantage of such situation is that it allows large possibilities for company reactivity to market fluctuations. A competitive environment is also favourable to creativity.

The disadvantage of this type of organisation is that companies have a very limited financial capacity to develop numerous products. Consequently, this leads to a very fragile educational multimedia market, numerous failures, as much in terms of aborted projects as well as companies disappearing. In some of these cases the (long term) efforts to meet the financial requirements are not rewarded because a more solid company has developed a similar product in a shorter time. The potential limitations of resources also limits the possibilities of communication surrounding products and their promotion.

In fact, only the home market (edutainment, multimedia supporting programs, reference tools, etc.), few niches (such as electrotechnics to vocational schools) and integrated supply for large organisations allow a certain volume of revenues.

In the last years, however, the “big players” have shown an increased interest for the education and training market and often have modified their approach: from the creation of small specialised subsidiaries they are moving towards the acquisition of successful smaller companies that are rooted in the sector of MM for training and education and operate at a national level.

This new approach seems to be more appropriate because it combines financial strength with existing expertise in a way that was not common in the past. It is also a possible path towards the internationalisation of the E&T multimedia market.

6. Growing technology penetration

In the latest years a high growth has been observed in the diffusion of ICT in all European countries, and the trend is expected to continue vigorously, especially in those country that used to be relatively less advanced.

Education and training usages are responsible for about one third of the multimedia development. One factor that results from both MESO and other studies is that quick advance in the home market is generating pressure on the education and (to a lesser extent) training segments as well.

A sort of “virtuous circle” is created, in which users familiarise with multimedia

tools in the framework of entertainment activities, and then become able and willing to use multimedia products and services either for educational or for training purposes. In particular, young people seem to be the main users and thus the most important target of entertainment and edutainment production. This brings out positive effects on their attitude towards the use of multimedia tools at school and, in the future, in the workplace.

On the other side of the relationship, even slow progress of multimedia in the education system is generating significant results on the consumers' market, by supporting general favourable attitudes in families towards the use of multimedia for learning purposes.

Another aspect should not be underestimated: the growing diffusion of ICT is involving a growing proportion of European population, but not all of it.

The risks of new forms of social exclusion have been considered in many theoretical papers, but the concrete results of MESO and the other studies analysed to write this report show that this risk is a serious one and that measures are required not only to provide learning access opportunities to the less favoured through ICT – based learning centres, but also to generate awareness and motivation to use access opportunities by the same audience.

7. CD-ROM and Internet/Intranet leading the E&T Multimedia Market

CD-ROM represents by far the largest part of the E&T multimedia market, whilst Internet/Intranet applications are growing more quickly, but starting from a much more reduced base, at least in economic terms.

Broadcasting and videoconference are still modest in economic terms, but growth is expected in some market segments (university networks, corporate training, etc.). Integration of technological platform is considered to be the natural trend of the present and coming years. The MESO survey conducted on multimedia suppliers confirms that globally the platforms which are considered as relevant are the CD-ROM and Internet.

The installed base equipped with CD-ROM drives is considered as sufficient in order to attain a mass market in a year, which will not be possible for the DVD before several years. The whole of publishers have strategies implementing Internet but following different scenarios.

For certain of them the two platforms are perceived and developed following their complementarity but we notice that the number of hybrid products is still low. Other publishers consider Internet to be an extension of the production via a new distribution channel, the pedagogical multimedia are for them more a question of scripting training modules than a choice of technical platform.

The last publishers category is leaving progressively the CD-ROM for Internet

and reckon on an evolution of the publisher's profession towards the one of training offered implementing tools and services on Intranet.

If the first market segment targeted is principally the corporate one, these providers do not exclude the possibility of developing, in a near future, of such offers for more institutional markets like, for instance, colleges at the a regional level.

8. *Growing importance of industrial products compared to amateurial products*

The DELPHI forecast study conducted within MESO predicts a growth in the market share of industrial multimedia products for the open market and a corresponding reduction of the share of "amateurial" products developed by groups of teachers and/or very small specialised organisations.

The decrease, nevertheless, should not affect the bespoke products developed for large user organisations by highly professional consultants and training bodies. It should be noted, however, that standardisation of products and customisation of training solutions are not reciprocally inconsistent: open learning approaches developed in the '80s have already proved that "industrialisation" in the production of modular learning materials may be supportive of affordable access to individualised learning paths.

A related estimation concerns expected market shares of different categories of suppliers: major companies are expected to increase their presence in the market, smaller companies to decrease; institutional and semi-institutional providers (universities, institutional publishers, associations) are expected to decrease their presence, with a relatively minor decrease for training bodies, which have a stronger position in their niche market, very sensitive to the specialised service component.

9. *Tendential convergence of production processes*

In parallel with the well known convergence of technologies, a starting convergence of production processes can be recognised, again mainly through the new visibility of supply options that Internet is making possible: professional electronic publishing for the open market, professional and tailor-made product and system design for large customers and "amateur" production by groups of teachers used to be separate ways of development of multimedia products for education and training, each one with its strengths and weaknesses.

In the last two-three years the actors implementing these modes of production are starting to establish some forms of collaboration (publishers with organised groups of teachers rather than individual authors, training consultancies with publishers, large organisations buying external licences for basic products from publishers).

This trend may well modify the relative positions of suppliers categories as forecast in the previous point: small companies and institutional actors may well develop strategic alliance orientations that will allow them to reach or maintain leading positions in the supply chain, especially if they are able to build on their higher specialisation and familiarity with specific market segments.

It must be noted, however, that the E&T multimedia industry is still in search of a production paradigm that will guide the involved organisation, since the four current paradigms (Book publishing, film production, software development and software game development) come from related industries and each of them is only partially able to grasp the specificity of learning in an ICT based environment.

10. Links between categories of suppliers and market segments

Categories of suppliers tend to focus and specialise on certain demand areas/segments, but the opposite is not equally demonstrable: users are open to consider a broad range of supply options and distribution modes.

For example, large organisations which used to order or produce their specific training products are now tendentially shifting towards the use of off-the-shelves or network-available learning products (which have improved their quality and do not require massive up-front investment).

A broader awareness is developing, in the education and in the training segments, about the need to integrate the use of ICT in a relevant, context-based way. The “why” and the “how” to use technologies in the learning process are replacing the “if”: the question is no longer to decide if ICT have some use in education and training. Educational and training institutions, training departments of industry and public administrations are finding their own path to an integrated use of ICT within the learning process, in coherence with their own problematics and strategic orientation.

In a word, if in the consumer market multimedia education can be proposed in the format of a product, in the education and training segments it is just a component to be integrated in a service provision framework.

Not by chance the perspectives of on-line distribution (that is a natural configuration to embed products into a service environment) are much better in

the education and training segments than in the home market.

11. The service component will still be dominant in the education and training market

Service will keep on playing a key-role in the educational and training market, and therefore companies already offering training and educational services beside their software production will surely be more competitive in the multimedia market. This explains much of the observed tendency towards vertical integration of the present phase of mergers and acquisitions.

The continuous growth in the number of Internet users contributes to keep a dominant service (as opposed to product) dimension in ICT-based education and training applications: the value of communication among learners and with teachers is very appreciated in the training sector, in the education sector (particularly at university level) and even in the home market - the area in which stand alone multimedia products have driven market development in the last years. This dimension is recognised and developed by national and local policy makers, who have made a clear choice on distributed learning systems in almost all the public initiatives started in 1997/98.

12. Copyright problems

This is today one of the major problems to the multimedia industry. As well as the fact that some companies are using "in all good faith" images, animations or sounds for which they do not have the rights, the pirating of products by consumers is even more important. It was believed, for example, that the development of CD-ROM would limit this phenomenon but it has not because the price of recording equipment (CD-ROM engravers) is more and more affordable.

Concerning educational multimedia products, companies are even less optimistic in the sense that teaching staff are well known for the illegal use of products. In the name of knowledge for all they think (for the most part in good faith) that the products do not have restrictive rules on use.

The same type of phenomenon is found with the use of photocopies or the broadcasting of videocassettes. Several societies have complained about the absence of legislation concerning copyright and are calling for intervention on an International or at least European level; but others are content with legal gaps which allow them, for example, to create promotional windows of their products on the Internet when they have only acquired the rights for off-line products. In all cases, if there are political developments in the sense of a formalisation of regulations, it is important that this considers the specific character of an educational multimedia product as part of its use in groups.

PRACTICES AND POLICIES

13. On line platforms are better accepted than off-line solutions in institutional education and training

On-line has succeeded where off-line had not really achieved satisfactory results: convincing the teacher and trainers communities that ICT makes sense in the institutional education and training environment. This is the result of different (sometimes almost opposed) points of view:

- ♦ conservative academics and teachers like on-line solutions (especially video-conferencing) because they keep their key position in defining contents and methods towards the group of learners, where this position was threatened in the stand-alone access to learning materials;
- ♦ innovative teachers and pedagogists appreciate the value of human interaction through the network and the potential for collaborative learning that on-line solutions offer;
- ♦ “learning organisation” supporters find on-line collaboration very suitable to work-based learning and coherent with organisational and inter-organisational learning networks.

Also learners usually find on-line based learning systems more approaching than off-line solutions because they appreciate the communication with other (remote) learners and the exchange of experience.

As a whole, the broad acceptance of on-line platforms in the education and training segments will most probably lead to a generalised change in learning practices in the next years to come.

Public policies in almost all European countries are also pushing towards this direction by providing telecommunications facilities to schools together with multimedia computers and by training teachers to use communication technology for learning purposes.

14. Increased autonomy of learners and evolution in purchase decision making processes

The recent stream of policies to support the lifelong learning idea and practice, the accent posed in all recent pedagogical approaches on autonomy of learner, the objective increase of age and educational level of the average learner are all challenging forces to the usual assumption that in most cases the decision to buy education and training products is not taken by the learners (the final user), but by a “prescriptor” (a teacher, an educational authority, the head of a training department, etc.).

In addition to this, in most European countries the real growth in the Multimedia Education market has come from the Home segment rather than the institutional education and the corporate training segments. There the young or adult learner is a consumer, with his own criteria for choice and his own sensitivity to price, product and service components, etc..

So, even though almost all suppliers and experts consulted by MESO agree that “institutional intermediaries” between suppliers and learners will have an important role for many years to come, the trend towards a more autonomous learner is observable and the North-American market tells us a lot on the tendential “disintermediation” of education and training provision.

An effort to understand the education and training multimedia market cannot forget to pay attention to this trend and to investigate learners’ criteria and behaviour when choosing a learning product.

Failure to do so may lead, in the medium term perspective, to a failure of institutional education and training systems to adapt their provision to the user requirements and to a progressive marginalisation to those areas in which a formal title or qualification is the only motivation to undertake a learning programme.

15. Perceived role of public policies

The role of public policies is still seen as a fundamental driving force for market development not only in terms of funding.

Great expectations exist on the impact of public measures that are now in preparation or in the early phase of implementation. Public funding, legislation to recognise ODL and multimedia as legitimate ways to organise education and training, specific incentives to apply telematics in education and training are supporting market growth not only because of the material impact of public funds, but also for the confidence climate that they may generate in the suppliers’ and users’ minds.

Actually it seems that public authorities in the main European countries have understood the stakes of educational multimedia, and the number of initiatives, local, national and European are starting to multiply. They are taking shape by the setting up of financial support funds, and incentives to develop infrastructures, programmes and lower the cost of equipment for schools.

16. European convergence in policy making

A potentially significant new fact is the emergence of multi-country projects directly supported by many national Ministries of Education which have among their objectives to involve private partnership in a systematic way. The generation of policy convergence in European countries on this issue should be viewed as a possible major factor of market development for the years to come.

Up to now, in fact, European policies have been recognised as successful in changing the attitudes towards Open Distance Learning and ICT, but a new generation of measures is required to stimulate bottom-up initiatives from education and training environments (e.g. *Ned@ys*, but also incentives to users categories) as well as support to co-ordination among national authorities (e.g. EUN).

17. Public-private partnership

The DELPHI policy survey conducted within MESO allows to detect a very favourable attitude among experts towards public-private initiatives in the field of multimedia E&T. These are in fact multiplying, but according to national or sectoral differentiated models.

The ideas of a European Foundation for Educational MM (as a European level example of public-private partnership) were also proposed to the DELPHI panel, which identified the following as most relevant tasks: support for transnational mobility of learning programmes and products; strategic advice to the EU Commission, national government and industry; information provision for users; observatory on market trends; brokerage to bring together suppliers of capital and those needing it; help desk for those small-scale projects which intend to grow, but do not have the necessary marketing/dissemination expertise to cope with the market; implementation of a system of "licence mixte" for particular subjects.

Quite relevant tasks, though less quoted than the above mentioned, are the following: the definition of standards for the multimedia industry and the provision of venture capital. Generally speaking, the idea of establishing a European Foundation for multimedia education (and its proposed tasks) has received very favourable comments.

18. De-institutionalisation and European strategic interest

Spontaneous market development has been stronger in the segments of home learners and large organisations in the last two years: this leaves a modest role, in market development and service provision, to the institutional education and training systems.

Since the objective of innovating these systems is still a priority in the agenda of European policy makers, public initiative is currently trying to involve schools, universities, institutional training systems into the mainstream of multimedia educational products and service development.

What seems to be important is not to keep institutional education and training systems isolated to preserve their aims, but rather to influence market development in such a way that learning concerns prevail on technology-led developments, in a context of well balanced partnership.

An additional advantage of such an approach is to shift the focus of the problem from “the multimedia product” to “the learning-related service incorporating multimedia product”. On the latter ground European actors are not, by definition, weaker than their global competitors, and the capacity to grasp users’ needs and to interact with them may well compensate for lower investment capacity of media groups. In order to implement such orientation, new partnerships have to be established, in which education and training concerns are combined with those of industrial policy.

Models to implement a range of learning services - not only teaching, but also supporting collaborative learning, guidance, assessment, certification, access to structured learning environments - may be generated in the European context by taking advantage of the technology convergence.

They should be specific to large or narrower demand segments (e.g. teachers’ training, civil service innovation programmes, secondary schools, SMEs environments, etc.) in order to be relevant: this means that organised users should take a very active role not only in specifying their requirements, but also in the design and development of the related services, and in the definition and exploitation of the commercial viability of the services.

Education and training bodies cannot be seen only as “users” and “content providers”, but rather, in a federative effort, as “masters of the game” of E&T service provision. This does not mean to give a marginal role to industrial actors, but rather to build on the strengths of European education and training institutions to develop a coherent industrial approach within this sector, that is and will continue to be one in which the dimension of public service - although partially operated by private entities - is extremely relevant.

Focusing partnership on E&T institutions can also facilitate alliance among private industrial actors, which are so reconducted to a supportive function to general priorities rather than encouraged to compete in a trial-and-error game to get more users in the E&T sector, without stimulating/producing any strategic innovation capacity in this sector.

That is why any possible major partnership between public and private actors at the European level should keep innovation of E&T as its key focus: strategically oriented and innovative E&T bodies are the best condition for the multimedia market development in absolute value and in qualitative aspects. Among other impacts, it would reduce the presently high risk of failure in industrial investment.

APPENDIX 2

BIBLIOGRAPHY

- ◆ A strategy report from the Ministry of Education, Informationsteknologi og uddannelse (Information technology and education), 1997
- ◆ A strategy report from the Ministry of Research, Info-samfundet år 2000 (Information society year 2000), 1994
- ◆ A survey by The National Association of Local Authorities, Information Technology in Primary and Lower Secondary Education, an investigation into the ICT effort in Danish municipalities in 1998
- ◆ Addison-Wesley (Hrsg.): Fachwissen Computer. Verlagsprogramm. Bonn (1997)
- ◆ AIMIA Newsletter, vol. 4 no 3, July 1997
- ◆ AIMIA: URL: <http://www.aimia.com.au>
- ◆ AME: URL: <http://www.amme.com.au>
- ◆ Andersen Arthur, Strategic Developments for the European Publishing Industry in the year 2000, (1996)
- ◆ Andre Kurz.: Computer für jeden Grundschüler. In: taz, die tageszeitung, 25.04.1998. Berlin (1998). (URL: http://www.taz.de/taz/980425.taz/wu_T980425.116.html)
- ◆ Australian Government home pages, mainly:
 - <http://www.abs.gov.au>
 - <http://www.dea.gov.au>
 - <http://www.deetya.gov.au>
 - <http://www.dist.gov.au>
 - <http://www.ipac.gov.au>
 - <http://www.nla.gov.au>
 - <http://www.noie.gov.au>
 - <http://www.ogit.gov.au>
- ◆ Base 1997, Multimedia for Education and Training, European publishers and products / Coord. ORAVEP. - 391 pages: Paris: janvier 1997.
- ◆ Bayerisches Staatsministerium für Unterricht, Kultus, Wissenschaft und Kunst (Hrsg.), Schüler- und Absolventenprognose 1996. Schriften des Bayerischen Staatsministeriums für Unterricht, Kultus, Wissenschaft und Kunst, Reihe A: Bildungsstatistik, Heft 32. München, 1996
- ◆ Beaudet, G (1997) Survey of Trends in Adult Education and Training in Canada - 1985-1995. ICEA/CAAE.
- ◆ Bellini, Mauro, Aziende in mostra sulla rete, in Il Sole 24ore informatica, 23 Gennaio 1998
- ◆ Berres & Partner: Internet Based Training. Karlsruhe (1997). (URL: <http://www.berres.de>)

- ◆ Beschluß der Kultusministerkonferenz (Hrsg.): Erklärung der Kultusministerkonferenz zur Medienpädagogik in der Schule mit Übersicht über wichtige medienpädagogische Aktivitäten in den Ländern. Bonn (1995), (URL: http://dbs.schule.de/nis.kmk_ref.html)
- ◆ Beschluß der Kultusministerkonferenz (Hrsg.): Neue Medien und Telekommunikation im Bildungswesen/Hochschulbereich. Bonn (1995)
- ◆ Börsenverein des deutschen Buchhandels e.V. (Hrsg.): Zukunftsmarkt elektronische Publikationen - Impressum. Frankfurt am Main (o.J.). (URL: http://www.boersenverein.de/veroeff/12ia_02.html)
- ◆ Botti S., Zambon N., Il mercato dei CD ROM in Italia: problematiche e prospettive di sviluppo, Working paper n.17, Osservatorio di marketing - Università SDA BOCCONI, Milano, Primavera 1996
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (bmbf): Grund- und Strukturdaten 1996/97, Bonn, 1996
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Hrsg), Bekanntmachung eines Ideenwettbewerbs für Leitprojekte zum Themenfeld "Nutzung des weltweit verfügbaren Wissens für Aus- und Weiterbildung und Innovationsprozesse", (URL: <http://www.bmbf.de>)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Hrsg), Berichtssystem Weiterbildung VI. Integrierter Gesamtbericht zur Weiterbildungssituation in Deutschland, Bonn, 1996
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie(BMBF): Zur technologischen Leistungsfähigkeit Deutschlands 1997. Wichtige Ergebnisse der Studie in Stichworten. Bonn (1998). (URL:<http://www.bmbf.de/presse/pm-010998.htm>)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (BMBF): Bekanntmachung zu MEDIA@Komm - Städtewettbewerb Multimedia. Bonn (1998). (URL: <http://www.bmbf.de/neues/media.htm>)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (BMBF): Pressedokumentation zum Ideenwettbewerb 'Nutzung des weltweit verfügbaren Wissens für Aus- und Weiterbildung und Innovationsprozesse'. Bonn (1998). (URL: www.bmbf.de)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Federal Ministry of Education, Science, Research and Technology). Grund- und Strukturdaten 1996/97 (Basic and Structural Data 1996/97). International Comparison.
- ◆ Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung: Multimedia im Hochschulbereich- Erster Bericht der BLK Staatssekretärs-Arbeitsgruppe. Materialien zur Bildungsplanung und zur Forschungsförderung, Heft 63. Bonn (1998). (URL: <http://www.bn.shuttle.de/blk>)
- ◆ Bund-Länder-Kommission: Bericht Nr. 54 Perspektiven für das Studieren in der Informationsgesellschaft durch Weiterentwicklung des Fernstudiums.
- ◆ Burge, E. & Roberts, J., (in press) Classrooms with a Difference; Facilitating Learning on the Information Highway (2nd ed.) Chenelière/ McGraw Hill
- ◆ Cambell, B. (1996) The Learning Industries. Industry Canada
- ◆ CD-ROM de loisirs, Synthèse/Panels GFK. - Paris, 1996
- ◆ CMEC (1996) The Development of Education. Canada's Report for the 45th International Conference on Education

- ◆ Consiglio dei Ministri, Accordo per il lavoro tra il Governo e le Pari Sociali, 24 th of September 1996
- ◆ Cornelsen Verlag Hrsg.) Lernsoftware. Unterrichtssoftware. Lehrersoftware. Verlagsprospekt. Berlin (1996)
- ◆ Daniel Dirks.: Alter statt Können, Tabu statt Offenheit. In: Süddeutsche Zeitung 07.03. 1998, SZ-Serie: Achtung Leistung! Messen, beurteilen, fördern/ Teil 3. München (1998). (URL: www.sueddeutsche.de/cgi-bin...19980307/beruf_c.htm&date=19980307).
- ◆ Datamonitor, Multimedia in Training and Education, 1997
- ◆ Department for Education and Employment: White Paper Cn 3681: Excellence in schools, July 1997 ISDN 0-10-136812-7.
- ◆ Deutsche Telecom: T-Mart. Global Learning: Forum für Bildung im Netz. Interactive Media Systems. Bonn (1997). (URL: <http://www.telecom.de/angebot/t-mart>)
- ◆ Deutsche Telekom (Hrsg.), Auf einen Blick: Die wichtigsten Daten der deutschen Telekom. Das Unternehmen, Bonn, 1997, (URL: http://www.telekom.de/untern/g_zahl/right.htm)
- ◆ Deutsche Telekom (Hrsg.), Geschäftsbericht 1996, Bonn, 1996, (URL: http://www.telekom.de/g_zahl/g_bericht96/mobil.htm)
- ◆ Deutscher Bundestag, Gesetz zur Regelung der Rahmenbedingungen für Informations- und Kommunikationsdienste (Informations- und Kommunikationsdienste-Gesetz IuKDG) in der Fassung des Beschlusses des Deutschen Bundestages vom 13. Juni 1997, Bonn, 1997, (URL: <http://www.iid.de/rahmen/iukdgbt.html>)
- ◆ Developed by the National Documentation Center in Athens, Greece, Study on Assessing the Present Situation of the Markets for Electronic Information Services in Greece – MSSTUDY, December 1995
- ◆ Dickinson, P.T. (1996) Access to the Information Highway: Canadian Households. Industry Canada.
- ◆ Digital Media Champion Group (1998) Playing to win: The Digital Media Industry in Ontario. DMCG/MEDTT/ MCCR.
- ◆ Dyned International. Language development courseware. URL: <http://www.dyned.com>.
- ◆ Education in Japan 1994. A Graphic Presentation. Ministry of Education, Science and Culture.
- ◆ Educational Multimedia in the European Union and in the Main Third Countries. Annex to the Task Force Report of July 1996 (SEC961426), Chapter 19: Australia
- ◆ EITO, European Information technology Observatory 97, 1997
- ◆ ELEFTHEROTYPIA, Creative Marketing and Amer Nielsen Research SA research on Internet, 26-10-97
- ◆ Emilio Pucci, L'industria della comunicazione in Italia 1996, Nuove Tecnologie, nuovi attori, nuove regole, Fondazione Rosselli - Istituto di Economia dei Media, Guerini e Associati, Torino, 1996
- ◆ Empfehlungen des 179. Plenums der Hochschulrektorenkonferenz (Hrsg.): Moderne Informations- und Kommunikationstechniken (Neue Medien) in der Hochschullehre, in «Dokumente zur Hochschulreform» 111/1996. Bonn (1996)

- ◆ European Commission DG XIII/E, Strategic developments for the European publishing industry towards the year 2000-Main report, 1997
- ◆ European Commission: Japan. Annex to the Task Force Report Educational Multimedia in the European Union and in the Main Third Countries. July 1996.
- ◆ Fittkau, Susanne, Holger Maaß, W3B-Studie, Hamburg (1997). (URL: <http://www.w3b.de>)
- ◆ Francis, J.N.P.& Caldwell, S. (1996) BC's IT Industry: Export Performance and Strategies. Industry Canada
- ◆ Froman, A. (1998) The CanCon New Media Sessions. IMAT/ APMQ/ Multimediator.
- ◆ FTI - FORUM per la TECNOLOGIA della INFORMAZIONE, La Tecnologia dell'Informazione e della Comunicazione in Italia. Rapporto 1998, Franco Angeli, Milano, 1998
- ◆ Fujitsu Laboratories. Developing Core Technologies For a Multimedia Future. URL: http://www.fujitsu.co.jp/hypertext/About_fujitsu/Pamphlet/E-intro.html
- ◆ Further Education Funding Council: Council News no 39: 30 May 1997.
- ◆ Further Education Funding Council: Learning Works: Widening Participation in Further Education: (The Kennedy Report): June 1997.
- ◆ Further Education Funding Council: Report of the Learning and Technology Committee (The Higginson Report): January 1996.
- ◆ Graf, Joachim: Ritter fort. hightext Verlag, München (1997), (URL: <http://www.hightext.de/archiv/0697.htm>)
- ◆ Hamburger Medienhaus (Hrsg.): Wissen, Sprachen, Reisen. Hamburg (1997)
- ◆ Haughey, M. & Roberts, J (1996) Canadian policy and practice in open and distance schooling, In T. Evans & D. Nation (eds) Opening Education. London: Routledge.
- ◆ Heritage Canada (1997) Cultural Community to Benefit as Copyright bill receives Royal Assent. Government of Canada.
- ◆ IHAC (1996) Connections, Community, Content - The Challenge of the Information Highway; The Final Report of the Information Highway Advisory Council. Industry Canada.
- ◆ Il Sole 24 ORE informatica, Italia: un mercato in affanno, Press release, Milano, Venerdì 7 Aprile 1997 - Internet address: <http://www.ilsole24ore.it/informatica/>
- ◆ Il Sole 24 ORE informatica, Tutti gli indicatori introdotti dall'autorità, Press release, Milano, Venerdì 4 Aprile 1997 - Internet address: <http://www.ilsole24ore.it/informatica/>
- ◆ IMAT (1995) IMAT Survey of the Canadian Multimedia Industry. Interactive Multimedia Arts and Technologies (IMAT) & Industry Canada.
- ◆ Industry Canada (1996a) Market Assessment Study of New Media Learning Materials Volume 2. Industry Canada
- ◆ Industry Canada (1996b) New Media Consortium Model: A guide for local-regional development of multimedia capabilities. Industry Canada
- ◆ Industry Canada (1997a) Investment Climate and Opportunities: The Multimedia Industry in Canada. Industry Canada
- ◆ Industry Canada (1997c) Canada: A World Leader in Rural Telecommunications. Industry Canada
- ◆ Industry Canada (1997b) Survey of Technology Diffusion in Service Industries. Industry Canada

- ◆ Initiative "Bayern Online"; Datenhochgeschwindigkeitsnetz und neue Kommunikationstechnologien für Bayern. (URL: <http://www.bayern.de/BayemOnline/Konzept>)
- ◆ Institute for Public Policy Research: University for Industry: Creating a National Learning Network: by Josh Hillman: 1996. ISBN 1-86030-051-0.
- ◆ IT Industry in Japan: English language resources on the Web. URL: <http://www.fujitsu.co.jp/hypertext/link/index-e.html>.
- ◆ Japan Multimedia Forum. URL: <http://www.ciaj.or.jp/comto/ct007112.html>.
- ◆ Jensen, Steffen Educational Multimedia in the European Union and in the Main Third Countries, Annex to the Task Force Report of July 1996 (SEC961426), Chapter 3,- DENMARK
- ◆ John David Morley.: Konfuzianische Konfusion. Die fernöstliche Krise hat auch mit der kulturellen Tradition zu tun. In: Süddeutsche Zeitung, 29.04.1998. München (1998).
- ◆ Koring, Bernhard, Lernen und Wissenschaft im Internet. Anleitungen und Reflexionen zu neuen Lern-, Forschungs- und Beratungsstrukturen, Klinkhardt, Bad Heilbrunn (1997)
- ◆ Lambrakis Research Foundation: Study on Internet in German Schools. Athens (1998)
- ◆ Landesbildstelle Berlin: Beratungsstelle für Informationstechnische Bildung und Computereinsatz in Schulen (BICS), Berlin (1997) (URL: <http://www.be.schule.de/labi-be/bics/start.html>)
- ◆ Landesbildstelle Berlin: Beratungsstelle Kommunikationstechniken und Multimedia (BEKUM), Berlin (1997) (URL: <http://www.labi.be.schule.de/bekum/start.html>)
- ◆ Landesinstitut für Schule und Weiterbildung LSW (Hrsg.): Aufgabe und Struktur des Landesinstitutes, 9. Auflage, Soest (1997)
- ◆ Landesinstitut für Schule und Weiterbildung LSW (Hrsg.): Software-Dokumentations- und Informationszentrum (SODIS), Soest (1996)
- ◆ Le Marché multimédia en France, bilan économique 1996 / Electre Multimédia. - 50 pages, Paris: février 1997.
- ◆ Legge Dicembre 1996, Liberalizzazione delle telecomunicazioni
- ◆ Lernwelt (Hrsg.): Minikatalog. Lernwelt-infosoft, Großhandel für Lernsoftware, Springe 1997. (URL: <http://www.Lernsoftware.de>)
- ◆ Leuther, Ralph, Immer mehr Verlage setzen auf elektronische Produkte, Handelsblatt 6.5.97, o.O., 1997
- ◆ Librairies & Multimédia, les libraires et la vente des CD-ROM éducatifs, culturels, de loisirs / Union des Libraires de France. - 27 pages, Paris: juillet 1995
- ◆ Matzner, Uwi, Wirtschaftliche Aspekte des deutschen Buchmarktes, Leipzig, 1996, (URL: www.boersenverein.de/veroeff/buchmar.pdf)
- ◆ McGreal, R. (1995) Canadian Province: Distance Learning in New "Knowledge Economy, ED, Education at a Distance #1, 1995
- ◆ Médiangles On Line 97, l'Internet en France / Médiangles. - Paris, juin 1997
- ◆ Memorandum from the Ministry of Education, Teknologistøttet undervisning - Fjernundervisning, Betænkning 1253, (Open and Distance Learning), 1993
- ◆ Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg (Hrsg), Bekanntmachung des Ministeriums für Wissenschaft, Forschung und Kunst Baden-Württemberg über das Förderprogramm «Virtuelle Hochschule» im Rahmen der "Zukunftsoffensive Junge Generation", Stuttgart, 1997

- ◆ Ministero del Lavoro, Attuazione della legge 236/93 art.9 sugli interventi di formazione professionale continua, Circolare n°174, 23rd of December 1996.
- ◆ Ministero dell'Industria, Linee di politiche industriale, Documento di contributo all'Accordo per il lavoro, 24th of September 1996
- ◆ Ministero dell'Istruzione - Direzione generale Istruzione Secondaria di Primo Grado, Bozza di Documento 15 Marzo 1997 (elaborato dal gruppo di lavoro nominato con D.D: 30/11/96 del Marzo 1997)
- ◆ Ministero dell'Istruzione, Attuazione della Direttiva n° 318, Circolare ministeriale n° 31, 19th of January 1996
- ◆ Ministero dell'Istruzione, Piano Nazionale sull'Information Technology, May 1985
- ◆ Ministero dell'Istruzione, Progetto di riordino dei cicli scolastici, 3rd of June 1997
- ◆ Ministero dell'Istruzione, Progetto di Sperimentazione Multilab, Documento di base, 1996
- ◆ Ministero dell'Istruzione, Protocolli d'intesa con STET-Telecom e RAI, 1st and 6th of December 1995
- ◆ Ministero per i Beni Culturali e Ambientali - Divisione editoria, Rapporto sullo stato dell'editoria in Italia, Quaderni di Libri e Riviste d'Italia, n.34, Istituto poligrafico e Zecca dello Stato, Roma, 1996
- ◆ Ministro dell'Istruzione, Programma di Sviluppo delle Tecnologie didattiche, Direttiva n° 318, 4th of October 1995
- ◆ Ministry of International Trade and Industry. Program for Advanced Information Infrastructure. May 1994. URL: <http://www.glocom.ac.jp/NEWS/MITI-doc.html>.
- ◆ Ministry of Post and Telecommunication: Statistics. Tokio (1997). (URL: www.mpt.go.jp/whatsnew/school_inet.html.)
- ◆ Ministry of Posts and Telecommunications. Communications Policy Bureau's map. URL: <http://www.mpt.go.jp/outline/compoli.html>.
- ◆ MONBUSHO 1994. Published by the Ministry of Education, Science and Culture. Government of Japan.
- ◆ MONBUSHO Statistics: Number of Institutions, Students and Teachers. URL: <http://www.monbu.go.jp/em09010.html>.
- ◆ MONBUSHO, Ministry of Education and Science: Educational reform moving forward. Synopsis of the Curriculum Council's Midterm report. Tokio (1998). (URL: www.monbu.go.jp/series-en/00000011/#top)
- ◆ MONBUSHO: Expert discussion round on the subject 'Advancement of the Internet Use in Japanese Schools'. Tokio (1998).
- ◆ meeting (03.12.1997): URL: http://www.mpt.go.jp/whatsnew/edu_inet980122.html
- ◆ meeting (05.02.1998): URL: http://www.mpt.go.jp/whatsnew/edu_inet980205.html
- ◆ meeting (19.03.1998): URL: http://www.mtp.go.jp/whatsnew/edu_inet.html
- ◆ Multimedia Associations of Japan. URL: <http://inetsrv.ciaj.or.jp/jmf/today/jm000277.html>
- ◆ Multimedia Societal Aspirations in a Creatively Abundant 21. URL: <http://www.ciaj.or.jp/jmf/jm000188.html>.
- ◆ Multimedia Today Menu. URL: <http://www.ciaj.or.jp/jmf/today/jm000467.html>.
- ◆ Multimedia/Disatnce Learning. URL: <http://www.ccnj.net/media.html>.

- ◆ MultiMediator Canadian Developers Directory (<http://www.multimediator.com/directory/index.shtml>).
- ◆ Musashi Institute of Technology. URL: <http://www.adm.musashi-tech.ac.jp>.
- ◆ N.N., Anteile der Warengruppen am Umsatz 1995, Kölner Betriebsvergleich, 1996
- ◆ N.N., Buchhandel setzt auf Elektronik. DMA - Deutsche Medienbeobachtungsagentur Berlin, Iserlohner Kreisanzeiger und Zeitung 19.4.97, Iserlohn, 1997
- ◆ N.N., CBT-Akzeptanz in Deutschland und Österreich gestiegen, multiMEDIA 2/97, hightext Verlag, München (1997)
- ◆ N.N., CBT-Online: Zeit für Pioniere, CBT 1/97, hightext Verlag, München, 1997
- ◆ N.N., CD-Laufwerke vor allem für den Heim-PC, multiMEDIA 7/95, hightext Verlag, München, 1995
- ◆ N.N., CD-Rom-Laufwerke in Deutschland, Österreich und der Schweiz, in: multiMEDIA 7/95, hightext Verlag, München (1995) (URL: <http://www.hightext.de>)
- ◆ N.N., Computereinsatz im Physikunterricht, ZUM-Zentrale für Unterrichtsmedien. Freiburg, 1996, (URL: <http://www.zum.de>)
- ◆ N.N., Das Wachstum der Rechner, Universität Karlsruhe, Rechenzentrum/DE-NIC. Karlsruhe, 1997, (URL: <http://www.nic.de/Netcount/netStatOverview.html>)
- ◆ N.N., Das Wachstum des Internet, Universität Karlsruhe, Rechenzentrum/DE-NIC. Karlsruhe, 1997, (URL: <http://www.nic.de/Netcount/netStatOverview.html>)
- ◆ N.N., Datenhighway ins Klassenzimmer, Süddeutsche Zeitung 19./20.4.97, München, 1997
- ◆ N.N., Der günstigste Internet-Zugang, FOCUS Online GmbH, o.O., 1997), (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Deutscher "Edutainment" - Markt wächst auf 1,3 Milliarden Mark, in: multiMEDIA 10/95, hightext Verlag, München, 1995
- ◆ N.N., Deutschland wird größter europäischer CBT-Markt, CBT 1/96, hightext Verlag, München (1996) (URL: <http://www.hightext.de>)
- ◆ N.N., Die größten CD-Rom- Publisher im Bereich: Allgemeine Lernsoftware, in: multiMEDIA 3/97, hightext Verlag, München, 1997
- ◆ N.N., Die größten CD-Rom-Publisher im Bereich: Business-Lernsoftware, in: multiMEDIA 3/97, hightext Verlag, München, 1997
- ◆ N.N., Die multiMEDIA-Publisher-Liste: Die größten deutschsprachigen CD-ROM-Publisher 96, multiMEDIA 3/97, hightext Verlag, München, 1997
- ◆ N.N., EDV und Neue Medien, buch nrw 2/97, o.O., 1997
- ◆ N.N., Elektronisches bei Langenscheidt, Leipziger Lerche Nr. 6. Leipzig, 1997
- ◆ N.N., Erfolg mit Markenware, GLOBAL ONLINE 4/97, o.O., 1997
- ◆ N.N., Facts and figures 1997, tfpl multimedia, London (1997). (URL: <http://www.tfpl.com/webfact.htm>)
- ◆ N.N., Für die Fachverlage werden Online- Anbindungen unverzichtbar, Handelsblatt 6.5.97, o.O., 1997
- ◆ N.N., Gute Gewinne zunächst nur mit Profis, Handelsblatt 15./16.3.97, o.O., 1997
- ◆ N.N., Interessen der Online-Nutzer, FOCUS Online GmbH o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)

- ◆ N.N., Internet-Provider in Deutschland 1997, (URL: [http://yahoo/de/Handel und Wirtschaft/Firmen/Internet-Dienste/Internet-Zugriffsvermittlung](http://yahoo/de/Handel%20und%20Wirtschaft/Firmen/Internet-Dienste/Internet-Zugriffsvermittlung))
- ◆ N.N., Klett AG hat ihren Umsatz um 7% auf 412 Millionen DM erhöht, aber der Schulbuchmarkt ist hinter den Erwartungen zurückgeblieben, Buchreport Nr. 28, o.O., 1997
- ◆ N.N., Klett-Verlag sieht Zukunft bei Multimedia, Süddeutsche Zeitung 14.7.97, München, 1997
- ◆ N.N., Ladbare Lern-, Lehr- und Betriebssoftware im Internet, Zentrale für Unterrichtsmedien, Freiburg (1996). (URL: <http://www.zum.de/cgi-bin/hoturls?software>)
- ◆ N.N., Lernmarkt in Bewegung, CBT 2/96, hightext Verlag, München, 1996
- ◆ N.N., Mitgliederzahlen der Onlinedienste und Provider, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.html>)
- ◆ N.N., Multimedia im Bildungsbereich, Medienpsychologisches Forschungsinstitut Saarland e.V. im Auftrag des Ministeriums für Bildung, Kultur und Wissenschaft des Saarlandes, o.O., 1997
- ◆ N.N., multiMEDIA Liste 1997. Die größten deutschen Multimedia-Entwickler nach Umsatz, multiMEDIA 2/97, hightext Verlag, München, 1997 (URL: <http://www.hightext.de>)
- ◆ N.N., Navigo Multimedia sucht Zukunft im Systema-Verbund, Börsenblatt für den deutschen Buchhandel 9.5.1997, Leipzig/Frankfurt, 1997
- ◆ N.N., Nutzung des Computers für den Fachunterricht, in: Gesamtkonzept für die informationstechnische Bildung in der Schule, Fortschreibung 1995. Schriften des Bayerischen Staatsministeriums für Unterricht, Kultus, Wissenschaft und Kunst. Reihe B: Datenverarbeitung im Bildungswesen, Heft 8. München, 1995
- ◆ N.N., PC-Ausstattung deutscher Haushalte, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Recherausstattung und Unterrichtssituation, in: Gesamtkonzept für die informationstechnische Bildung in der Schule, Fortschreibung 1995. Schriften des Bayerischen Staatsministeriums für Unterricht, Kultus, Wissenschaft und Kunst. Reihe B: Datenverarbeitung im Bildungswesen, Heft 8. München, 1995
- ◆ N.N., Schulbuchverlag Klett drückt im Internet selbst die Schulbank, Frankfurter Allgemeine Zeitung 19.5.97, Frankfurt, 1997
- ◆ N.N., Städtematrix: Die wichtigsten Knoten, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Studenten werden abgehängt, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Verdient Ihr CD-ROM-Regal sein Geld?, Buchreport Nr. 17, 24.4.1997, o.O., 1997
- ◆ N.N.: Bundespräsident Roman Herzog fordert eine Debatte über die Zukunft unseres Bildungssystems. In: Die Zeit, 07.11.1997 (URL:<http://www4.zeit.de/bda/int/zeit/aktuell/artikel/herzog.txt.19971107.html>)
- ◆ N.N.: Der Internet Software-Shop der ASK/ASKnet. Akademische Software Kooperation (ASK) an der Universität Karlsruhe. Karlsruhe (1997), (URLs: <http://www.ask.uni-karlsruhe.de>, <http://www.asknet.de>)
- ◆ N.N.: Development of the computer branch - Informations on the CeBIT fair. In: Meso newsboard 03/98. (URL: <http://www.meso.odl.org/newsboard>).

- ◆ N.N.: Education, training and media competence: SIG report. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Ehe im Internet-Buchhandel. In: Süddeutsche Zeitung 29.04.1998. München (1998).
- ◆ N.N.: Für Deutschland hängen die 'High-Tech-Früchte' noch zu hoch. bild der wissenschaft, news ticker , o.O.(1997)
- ◆ N.N.: German labour market funds now open for technology-based training. In: Meso newsboard 02/98. . (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: German Telecom and Lower Saxony draw the multimedia-balance. In: Meso newsboard 03/98. (URL: <http://www.meso.odl.org/newsboard>)
- ◆ N.N.: Hope for a massive increase of multimedia jobs did not come true. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Neuer Medienbericht der Bundesregierung: Künftig mehr neue Computer als Fernseher. bild der wissenschaft, news ticker , o.O. (1998).
- ◆ N.N.: New multimedia and CD-ROM titles in Germany. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Nomura Hometrade. In: Yahoo! JAPAN - Education:On-line Teaching and Learning. Tokio (1998). (URL: http://www.yahoo.co.jp/Education/On_line_Teaching_and_Learning)
- ◆ N.N.: Offene Schule 2001. Ein Förderprogramm für bayerische Schulen zur Unterstützung von BayernOnline. Microsoft GmbH- Forschung und Lehre (1998). (URL: <http://www.microfoft.com/germany/forschunglehre/schule2001.htm>)
- ◆ N.N.: Parlamentarische Staatssekretärin Elke Wülfing: Medienkompetenz ist eine Kernkompetenz der Zukunft. BMBF press release; Bonn (1998). (URL: http://bmbf.de/archive/presse/presse98/pm_020398.htm)
- ◆ N.N.: Rütgers: Riesen-Echo auf BMBF-Gründerwettbewerb Multimedia. BMBF press release, Bonn (1998). (URL: <http://www.bmbf.de/archive/presse/presse98/pm031798.htm>)
- ◆ N.N.: Rütgers: Deutschland auf dem Weg zum HighTech-Land. bmbf press release, Bonn (1998). (URL: http://www.bmbf.de/presse/pm_010998.htm)
- ◆ N.N.: Rütgers: Multimedia zum Anfassen. Media@Komm - Städtewettbewerb Multimedia gestartet. bmbf press release, Bonn (1998). (URL: <http://www.bmbf.de/archive/presse/presse98/pm0225c98.htm>)
- ◆ N.N.: Rütgers: Start frei für den BMBF-Gründerwettbewerb Multimedia. bmbf press release, Bonn (1997). (<http://www.bmbf.de/presse/pm102297.htm>)
- ◆ N.N.: School networks support shifts slowly towards teacher training. In: Meso newsboard 02/98. . (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Teachers claim for more time needed when expected to become more active in introducing telematics. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: The Leading Edge in Electronic Education. In: milia '98, The International Content Market for Interactive Media. Conference Program. Cannes (1998). (URL: <http://www.milia.com>)
- ◆ N.N.: Virtual University. In: Meso newsboard 03/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Ware via Internet. In: Nürnberger Nachrichten 05.05.1998. Nürnberg (1998).

- ◆ N.N.: Zukunftsmarkt elektronische Publikationen. Börsenverein des deutschen Buchhandels, Leipzig (o.J.), (URL: http://www.boersenverein.de/veroeff/12ia_01.htm)
- ◆ NACSIS. National Center for Science Information Systems. URL: <http://www.nacsis.ac.jp/brief/system-e.html>.
- ◆ National Education Center, Japan. Educational Training Activities. URL: <http://keinetwww.naec-go.jp/kensyu-e.htm>.
- ◆ NIME (National Institute of Multimedia Education) English Home Page. URL: <http://www.nime.ac.jp/index-e.html>.
- ◆ NIME Production Division. URL: <http://www.nime.ac.jp/seisaku/index-e.html>.
- ◆ NIME Space Collaboration System (SCS) Projects. URL: <http://www.nime.ac.jp/SCS/index-e.html>.
- ◆ NIME. Department of Educational Media Research. Theme of research. URL: <http://www.nime.ac.jp/E-Media/theme-e.html>.
- ◆ NIME. Higher Education-Projects. URL: <http://www.nime.ac.jp/HE/projects.html>.
- ◆ Noacco, D J: Multimedia Markets: A Study of Australian Content Developers. Australian Journal of Educational Technology, 11(2), 52-74, 1995
- ◆ O'Brien, C. (1996) Software Products and Computer Services: An Industry Profile. Industry Canada.
- ◆ OECD : Redefining the Place to Learn. OECD 1995.
- ◆ OECD: Education at a Glance. OECD Indicators. OECD 1992.
- ◆ OECD: Education at a Glance. OECD Indicators. OECD 1996.
- ◆ Organisation for Economic Co-Operation and Development (OECD): Lifelong Learning for All. OECD 1996.
- ◆ Pacey, L.M. & Penney, P. (1995), Thinking Strategically: Reshaping the Face of Distance Education and Open Learning.. In J.M. Roberts and E. M. Keough; Why the Information Highway? Lessons for Open and Distance Learning. Trifolium Books: Toronto.
- ◆ Paolucci U., Office 97 e il mercato italiano, Microsoft Magazine InterActive, Marzo - primavera 1997 - (enclosed CD-ROM)
- ◆ Peters, C. (1997) The Internet in Canada. Information Highway Advisory Council.
- ◆ Policy Reports/Telecommunications Council. Reforms toward the Intellectually Creative Society of the 21st Century. URL: <http://www.mpt.go.jp/po...rt1993No5/contents.html>.
- ◆ Policy Reports/Telecommunications Council. Section 1. Transition to an Intellectually Creative Society Based on Info-Communications. URL: <http://www.mpt.go.jp/policyreport1993No5/section1.html>.
- ◆ Policy Reports/Telecommunications Council. Section 2. The Implications of Info-Communications Infrastructure. URL: <http://www.mpt.go.jp/policyreport1993No5/section2.html>.
- ◆ Policy Reports/Telecommunications Council. Section 3. Characteristics of Fiber-Optic Networks. URL: <http://www.mpt.go.jp/policyreport1993No5/section3.html>.
- ◆ Policy Reports/Telecommunications Council. Section 4. The Goals for Building Info-Communications Infrastructure. URL: <http://www.mpt.go.jp/policyreport1993No5/section4.html>.

- ◆ Policy Reports/Telecommunications Council. Section 5. Developing and Introducing Applications. URL: <http://www.mpt.go.jp/policyreport1993No5/section5.html>.
- ◆ Policy Reports/Telecommunications Council. Section 6. Establishment of Subscriber Fiber-Optic Networks. URL: <http://www.mpt.go.jp/policyreport1993No5/section6.html>.
- ◆ Policy Reports/Telecommunications Council. Section 7. Recommended Measures Which Should Be Effected by the Government. URL: <http://www.mpt.go.jp/policyreport1993No5/section7.html>.
- ◆ Press release, Osservatorio Alchera (Alchera Strategic Vision), "Tendenze, attori, evoluzione e utilizzo delle nuove tecnologie in casa e in ufficio", Milano, 21 Marzo 1997 - Internet address: <http://www.alchera.it>
- ◆ Program for Educational Reform. Verbal comments on the Program, Program Outline. URL: <http://www.monbu.go.jp/series-en/00000001/>
- ◆ PWC Yokosuka Japan Reports & Statistics. URL: <http://www.pwcyoko.navy.mil/rpt/>
- ◆ Rapport de la Task Force "Logiciels éducatifs et multimédia" / Commission européenne Task Force Recherche - Industrie "Logiciels éducatifs et multimédias". - Bruxelles: juillet 1996.
- ◆ RAPPORTO ISFOL 1997, Formazione e occupazione in Italia e in Europa, Franco Angeli, Milano, 1997
- ◆ Roberts, J. (1995) Survey of Telematics for Education and Training Volume III. Commission of the European Communities Directorate-General for Telecommunications, Information market and Exploitation of Research.
- ◆ Rossipaul Kommunikation GmbH (Hrsg.): Neue Medien. München (1997)
- ◆ Rossipaul Kommunikation GmbH (Hrsg.): MultiMedien. Gesamtprogramm 1996/97. München (1996)
- ◆ Rüttgers und Sommer: 'In den nächsten Jahren alle Schulen ans Netz!' Telecom und BMBF stellen weitere 100 Millionen DM zur Verfügung. BMBF press release, Bonn (1997). (URL: <http://www.bmbf.de/presse/pm121697.htm>)
- ◆ Samborski, R.D. (1997) «Technology: the Challenge» conference proceedings from Leading Edge Training Technologies 5th Annual Conference. Victoria, British Columbia.
- ◆ Sander-Beuermann, Wolfgang: Internet-Zugänge in Deutschland. Hannover (o.J.). (URL: <http://www.rrzn.uni-hannover.de/inet-zu-de.html>)
- ◆ Schenkel, Peter, Educational Multimedia in the European Union and in the Main Third Countries. Annex to the Task Force Report of July 1996, European Commission, o.O., Germany, 1996, (URL: <http://www2.echo.lu/mes/en/countrep/countrep-de.html>)
- ◆ Schmidhäusler, Fritz J., Daten auf CD-Rom werden online aktualisiert, Börsenblatt für den deutschen Buchhandel 6.5.97, Leipzig/ Frankfurt a.M. (1997). (URL: <http://www.buchhandel.de>)
- ◆ School Curriculum and Assessment Authority: Higher Education in the Learning Society (The Dearing Report), July 1997. ISDN 0-858-38254-8.
- ◆ Schroedel Verlag (Hrsg.): Lernen mit Spaß am Computer. Schroedel Verlag GmbH, Hannover (1997) (URL: <http://www.schroedel.de>)
- ◆ Schulen ans Netz e.V. (Schools to the Network).Rüttgers und Sommer geben Startschuß für die dritte Ausschreibungsrunde. Press release, February 1998. (URL: <http://www.san-ev.de>)

- ◆ SchulWeb: SchulWeb-Statistik vom 06.Mai 1998.Berlin (1998). (URL: <http://www.schulweb.de/statistik.phtml>)
- ◆ SEMIS, Zentralstelle für Computer im Unterricht: Modellversuch «Schulischer Einsatz multimedialer interaktiver Systeme«, Augsburg (1997) (URL: <http://www.zs-augsburg.de/semis/semis.html>)
- ◆ Server der Zentrale für Unterrichtsmedien im Internet (ZUM). (URL:<http://www.zum.de>)
- ◆ Server der Deutschen Gesellschaft für Erziehungswissenschaft. (URL: <http://www.educat.hu-berlin.de/dgfe>)
- ◆ Server der Hochschul-Informationssystem GmbH (HIS). (URL: <http://www.his.de/abt3/proj/676/index.html>)
- ◆ Server der Initiative «Schule im Netz«. (URL: <http://www.sn.schule.de/schulen/land.html>)
- ◆ Server des Vereins der Kommunikations- und Beratungsstellen «Schulen ans Netz« (URL: <http://www.san-ev.de/>)
- ◆ Siemens-Nixdorf: Self-Learning Architecture from Siemens Nixdorf. Innovative Learning Made Easy. Nürnberg/München (1996).
- ◆ Stahmer, A. (1992) Commercial Education and Training - Industry Analysis. Industry Canada
- ◆ Statistisches Bundesamt (Hrsg.), Datenreport 1997. Zahlen und Fakten über die Bundesrepublik Deutschland, Bundeszentrale für politische Bildung, Bonn, 1997
- ◆ Stephen Rickard, Jenny Ertle, Robert Ertle: Reaching the Multimedia Market. In: Financial Times, Media and Telecoms. London (1998)
- ◆ Strategic Developments for the European Publishing Industry towards the year 2000.: Executive Summary / Commission européenne DG XIII/E. -54 pages, Bruxelles, Luxembourg: 1996
- ◆ Surfen macht den Meister. In: Süddeutsche Zeitung 06.05.1998. München (1998).N.N.:
- ◆ Systema Verlag(Hrsg.): Multimedia für höchste Ansprüche. Verlagsprogramm. München(1997)
- ◆ Task Force on Educational Multimedia, Country report on Greece
- ◆ The Ministry of Education, the Ministry of Research, the National Association of Local Authorities and the municipalities of Copenhagen and Frederiksberg, A budget analysis from the Ministry of Finance, 1996
- ◆ The model for Japanese education in the perspective of the 21st century. First report by the Central Council for Education. URL: <http://www.monbu.go.jp/special-en/00000001/>
- ◆ The Multimedia and CD-ROM Directory / TFPL Publishing, february 1997.
- ◆ The relationship between the University of the Air and the National Institute of Multimedia Education. URL: <http://www.nime.ac.jp/overview/objectives-e.html>.
- ◆ The White Paper: Excellence in Schools and the Dearing Report.
- ◆ Thiele, Günter A.: Produktive Medienarbeit in der Schule - Thesen und Erfahrungen. GMK-Rundbrief Nr. 34 (1993)
- ◆ Thomson Publishing International (Hrsg.): Gesamtverzeichnis Frühjahr/Sommer 1997. Bonn (1997)

- ◆ TVOntario (1997) TVO's Virtual Classroom: Get Connected (unpublished paper).
- ◆ Valdani Prof. E. - Mandelli Prof.ssa A., SDA Bocconi, Milano, La domanda di servizi Internet in Italia, 1996 - Internet address: http://www.tin.it/osservatorio_bocconi/ricerca/
- ◆ What is Laboratory for New Software Architectures? URL: <http://www.mgt.ipa.go.j...T/public/outline-e.html>.
- ◆ What is Open Fundamental Software Technology Project? Aiming at Advancement of Open Platform in the Future. URL: <http://www.ipa.go.jp/OFSTP/ofstp.html>.
- ◆ Wilking, Thomas, EP läßt auch Große Anlehnung suchen, Buchreport Nr. 20, 15.5.97, o.O., 1997
- ◆ World Statistics/Data published in Japan. URL: <http://www.jetro.go.jp/world/>
- ◆ World-Wide Web Access Statistics for ATLAS-Japan. URL: <http://arkhp1.kek.jp/managers/global/miscellaneousInfo/accessStat.src7ACCESSStat9410.html>.
- ◆ Zimmer, Jochen, Profile und Potentiale der Onlinenutzung, Media Perspektiven 9/96, S. 487-92, o.O., 1996
- ◆ Zincone, Maria Rosaria, Europa, Decolla il consumer, in Il Sole 24ore informatica, 3 Aprile 1998
- ◆ Zincone, Maria Rosaria, Italiani, zero in informatica, in Il Sole 24ore informatica, 20 Febbraio 1998
- ◆ Zincone, Maria Rosaria, L'Italia alla corte di Internet, in Il Sole 24ore informatica, 23 Gennaio 1998



APPENDIX 2

BIBLIOGRAPHY

- ◆ A strategy report from the Ministry of Education, Informationsteknologi og uddannelse (Information technology and education), 1997
- ◆ A strategy report from the Ministry of Research, Info-samfundet år 2000 (Information society year 2000), 1994
- ◆ A survey by The National Association of Local Authorities, Information Technology in Primary and Lower Secondary Education, an investigation into the ICT effort in Danish municipalities in 1998
- ◆ Addison-Wesley (Hrsg.): Fachwissen Computer. Verlagsprogramm. Bonn (1997)
- ◆ AIMIA Newsletter, vol. 4 no 3, July 1997
- ◆ AIMIA: URL: <http://www.aimia.com.au>
- ◆ AME: URL: <http://www.amme.com.au>
- ◆ Andersen Arthur, Strategic Developments for the European Publishing Industry in the year 2000, (1996)
- ◆ Andre Kurz.: Computer für jeden Grundschüler. In: taz, die tageszeitung, 25.04.1998. Berlin (1998). (URL: http://www.taz.de/taz/980425.taz/wu_T980425.116.html)
- ◆ Australian Government home pages, mainly:
 - <http://www.abs.gov.au>
 - <http://www.dea.gov.au>
 - <http://www.deetya.gov.au>
 - <http://www.dist.gov.au>
 - <http://www.ipac.gov.au>
 - <http://www.nla.gov.au>
 - <http://www.noie.gov.ua>
 - <http://www.ogit.gov.au>
- ◆ Base 1997, Multimedia for Education and Training, European publishers and products / Coord. ORAVEP. - 391 pages: Paris: janvier 1997.
- ◆ Bayerisches Staatsministerium für Unterricht, Kultus, Wissenschaft und Kunst (Hrsg.), Schüler- und Absolventenprognose 1996. Schriften des Bayerischen Staatsministeriums für Unterricht, Kultus, Wissenschaft und Kunst, Reihe A: Bildungsstatistik, Heft 32. München, 1996
- ◆ Beaudet, G (1997) Survey of Trends in Adult Education and Training in Canada - 1985-1995. ICEA/CAAE.
- ◆ Bellini, Mauro, Aziende in mostra sulla rete, in Il Sole 24ore informatica, 23 Gennaio 1998
- ◆ Berres & Partner: Internet Based Training. Karlsruhe (1997). (URL: <http://www.berres.de>)

- ◆ Beschluß der Kultusministerkonferenz (Hrsg.): Erklärung der Kultusministerkonferenz zur Medienpädagogik in der Schule mit Übersicht über wichtige medienpädagogische Aktivitäten in den Ländern. Bonn (1995), (URL: http://dbs.schule.de/nis.kmk_ref.html)
- ◆ Beschluß der Kultusministerkonferenz (Hrsg.): Neue Medien und Telekommunikation im Bildungswesen/Hochschulbereich. Bonn (1995)
- ◆ Börsenverein des deutschen Buchhandels e.V. (Hrsg.): Zukunftsmarkt elektronische Publikationen - Impressum. Frankfurt am Main (o.J.). (URL: http://www.boersenverein.de/veroeff/12ia_02.html)
- ◆ Botti S., Zambon N., Il mercato dei CD ROM in Italia: problematiche e prospettive di sviluppo, Working paper n.17, Osservatorio di marketing - Università SDA BOCCONI, Milano, Primavera 1996
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (bmbf): Grund- und Strukturdaten 1996/97, Bonn, 1996
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Hrsg), Bekanntmachung eines Ideenwettbewerb für Leitprojekte zum Themenfeld "Nutzung des weltweit verfügbaren Wissens für Aus- und Weiterbildung und Innovationsprozesse", (URL: <http://www.bmbf.de>)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Hrsg), Berichtssystem Weiterbildung VI. Integrierter Gesamtbericht zur Weiterbildungssituation in Deutschland, Bonn, 1996
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie(BMBF): Zur technologischen Leistungsfähigkeit Deutschlands 1997. Wichtige Ergebnisse der Studie in Stichworten. Bonn (1998). (URL:<http://www.bmbf.de/presse/pm-010998.htm>)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (BMBF): Bekanntmachung zu MEDIA@Komm - Städtewettbewerb Multimedia. Bonn (1998). (URL: <http://www.bmbf.de/neues/media.htm>)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (BMBF): Pressedokumentation zum Ideenwettbewerb 'Nutzung des weltweit verfügbaren Wissens für Aus- und Weiterbildung und Innovationsprozesse'. Bonn (1998). (URL: www.bmbf.de)
- ◆ Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Federal Ministry of Education, Science, Research and Technology). Grund- und Strukturdaten 1996/97 (Basic and Structural Data 1996/97). International Comparison.
- ◆ Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung: Multimedia im Hochschulbereich- Erster Bericht der BLK Staatssekretärs-Arbeitsgruppe. Materialien zur Bildungsplanung und zur Forschungsförderung, Heft 63. Bonn (1998). (URL: <http://www.bn.shuttle.de/blk>)
- ◆ Bund-Länder-Kommission: Bericht Nr. 54 Perspektiven für das Studieren in der Informationsgesellschaft durch Weiterentwicklung des Fernstudiums.
- ◆ Burge, E. & Roberts, J., (in press) Classrooms with a Difference; Facilitating Learning on the Information Highway (2nd ed.) Chenelière/ McGraw Hill
- ◆ Cambell, B. (1996) The Learning Industries. Industry Canada
- ◆ CD-ROM de loisirs, Synthèse/Panels GFK. - Paris, 1996
- ◆ CMEC (1996) The Development of Education. Canada's Report for the 45th International Conference on Education

- ◆ Consiglio dei Ministri, Accordo per il lavoro tra il Governo e le Pari Sociali, 24 th of September 1996
- ◆ Cornelsen Verlag Hrsg.) Lernsoftware. Unterrichtssoftware. Lehrersoftware. Verlagsprospekt. Berlin (1996)
- ◆ Daniel Dirks.: Alter statt Können, Tabu statt Offenheit. In: Süddeutsche Zeitung 07.03. 1998, SZ-Serie: Achtung Leistung! Messen, beurteilen, fördern/ Teil 3. München (1998). (URL: www.sueddeutsche.de/cgi-bin...19980307/beruf_c.htm&date=19980307).
- ◆ Datamonitor, Multimedia in Training and Education, 1997
- ◆ Department for Education and Employment: White Paper Cn 3681: Excellence in schools, July 1997 ISDN 0-10-136812-7.
- ◆ Deutsche Telecom: T-Mart. Global Learning: Forum für Bildung im Netz. Interactive Media Systems. Bonn (1997). (URL: <http://www.telecom.de/angebot/t-mart>)
- ◆ Deutsche Telekom (Hrsg.), Auf einen Blick: Die wichtigsten Daten der deutschen Telekom. Das Unternehmen, Bonn, 1997, (URL: http://www.telekom.de/untern/g_zahl/right.htm)
- ◆ Deutsche Telekom (Hrsg.), Geschäftsbericht 1996, Bonn, 1996, (URL: http://www.telekom.de/g_zahl/g_bericht96/mobil.htm)
- ◆ Deutscher Bundestag, Gesetz zur Regelung der Rahmenbedingungen für Informations- und Kommunikationsdienste (Informations- und Kommunikationsdienste-Gesetz iuKDG) in der Fassung des Beschlusses des Deutschen Bundestages vom 13. Juni 1997, Bonn, 1997, (URL: <http://www.iid.de/rahmen/iukdgbt.html>)
- ◆ Developed by the National Documentation Center in Athens, Greece, Study on Assessing the Present Situation of the Markets for Electronic Information Services in Greece – MSSTUDY, December 1995
- ◆ Dickinson, P.T. (1996) Access to the Information Highway: Canadian Households. Industry Canada.
- ◆ Digital Media Champion Group (1998) Playing to win: The Digital Media Industry in Ontario. DMCG/MEDTT/ MCCR.
- ◆ Dyned International. Language development courseware. URL: <http://www.dyned.com>.
- ◆ Education in Japan 1994. A Graphic Presentation. Ministry of Education, Science and Culture.
- ◆ Educational Multimedia in the European Union and in the Main Third Countries. Annex to the Task Force Report of July 1996 (SEC961426), Chapter 19: Australia
- ◆ EITO, European Information technology Observatory 97, 1997
- ◆ ELEFTHEROTYPIA, Creative Marketing and Amer Nielsen Research SA research on Internet, 26-10-97
- ◆ Emilio Pucci, L'industria della comunicazione in Italia 1996, Nuove Tecnologie, nuovi attori, nuove regole, Fondazione Rosselli - Istituto di Economia dei Media, Guerini e Associati, Torino, 1996
- ◆ Empfehlungen des 179. Plenums der Hochschulrektorenkonferenz (Hrsg.): Moderne Informations- und Kommunikationstechniken (Neue Medien) in der Hochschullehre, in «Dokumente zur Hochschulreform» 111/1996. Bonn (1996)

- ◆ European Commission DG XIII/E, Strategic developments for the European publishing industry towards the year 2000-Main report, 1997
- ◆ European Commission: Japan. Annex to the Task Force Report Educational Multimedia in the European Union and in the Main Third Countries. July 1996.
- ◆ Fittkau, Susanne, Holger Maaß, W3B-Studie, Hamburg (1997). (URL: <http://www.w3b.de>)
- ◆ Francis, J.N.P.& Caldwell, S. (1996) BC's IT Industry: Export Performance and Strategies. Industry Canada
- ◆ Froman, A. (1998) The CanCon New Media Sessions. IMAT/ APMQ/ Multimediator.
- ◆ FTI - FORUM per la TECNOLOGIA della INFORMAZIONE, La Tecnologia dell'Informazione e della Comunicazione in Italia. Rapporto 1998, Franco Angeli, Milano, 1998
- ◆ Fujitsu Laborastories. Developing Core Technologies For a Multimedia Future. URL: http://www.fujitsu.co.jp/hypertext/About_fujitsu/Pamphlet/E-intro.html
- ◆ Further Education Funding Council: Council News no 39: 30 May 1997.
- ◆ Further Education Funding Council: Learning Works: Widening Participation in Further Education: (The Kennedy Report): June 1997.
- ◆ Further Education Funding Council: Report of the Learning and Technology Committee (The Higginson Report): January 1996.
- ◆ Graf, Joachim: Ritter fort. hightext Verlag, München (1997), (URL: <http://www.hightext.de/archiv/0697.htm>)
- ◆ Hamburger Medienhaus (Hrsg.): Wissen, Sprachen, Reisen. Hamburg (1997)
- ◆ Haughey, M. & Roberts, J (1996) Canadian policy and practice in open and distance schooling, In T. Evans & D. Nation (eds) Opening Education. London: Routledge.
- ◆ Heritage Canada (1997) Cultural Community to Benefit as Copyright bill receives Royal Assent. Government of Canada.
- ◆ IHAC (1996) Connections, Community, Content - The Challenge of the Information Highway; The Final Report of the Information Highway Advisory Council. Industry Canada.
- ◆ Il Sole 24 ORE informatica, Italia: un mercato in affanno, Press release, Milano, Venerdì 7 Aprile 1997 - Internet address: <http://www.ilsole24ore.it/informatica/>
- ◆ Il Sole 24 ORE informatica, Tutti gli indicatori introdotti dall'autorità, Press release, Milano, Venerdì 4 Aprile 1997 - Internet address: <http://www.ilsole24ore.it/informatica/>
- ◆ IMAT (1995) IMAT Survey of the Canadian Multimedia Industry. Interactive Multimedia Arts and Technologies (IMAT) & Industry Canada.
- ◆ Industry Canada (1996a) Market Assessment Study of New Media Learning Materials Volume 2. Industry Canada
- ◆ Industry Canada (1996b) New Media Consortium Model: A guide for local-regional development of multimedia capabilities. Industry Canada
- ◆ Industry Canada (1997a) Investment Climate and Opportunities: The Multimedia Industry in Canada. Industry Canada
- ◆ Industry Canada (1997c) Canada: A World Leader in Rural Telecommunications. Industry Canada
- ◆ Industry Canada (1997b) Survey of Technology Diffusion in Service Industries. Industry Canada

- ◆ Initiative "Bayern Online"; Datenhochgeschwindigkeitsnetz und neue Kommunikationstechnologien für Bayern. (URL: <http://www.bayern.de/BayernOnline/Konzept>)
- ◆ Institute for Public Policy Research: University for Industry: Creating a National Learning Network: by Josh Hillman: 1996. ISBN 1-86030-051-0.
- ◆ IT Industry in Japan: English language resources on the Web. URL: <http://www.fujitsu.co.jp/hypertext/link/index-e.html>.
- ◆ Japan Multimedia Forum. URL: <http://www.ciaj.or.jp/comto/ct007112.html>.
- ◆ Jensen, Steffen Educational Multimedia in the European Union and in the Main Third Countries, Annex to the Task Force Report of July 1996 (SEC961426), Chapter 3,- DENMARK
- ◆ John David Morley.: Konfuzianische Konfusion. Die fernöstliche Krise hat auch mit der kulturellen Tradition zu tun. In: Süddeutsche Zeitung, 29.04.1998. München (1998).
- ◆ Koring, Bernhard, Lernen und Wissenschaft im Internet. Anleitungen und Reflexionen zu neuen Lern-, Forschungs- und Beratungsstrukturen, Klinkhardt, Bad Heilbrunn (1997)
- ◆ Lambrakis Research Foundation: Study on Internet in German Schools. Athens (1998)
- ◆ Landesbildstelle Berlin: Beratungsstelle für Informationstechnische Bildung und Computereinsatz in Schulen (BICS), Berlin (1997) (URL: <http://www.be.schule.de/labi-be/bics/start.html>)
- ◆ Landesbildstelle Berlin: Beratungsstelle Kommunikationstechniken und Multimedia (BEKUM), Berlin (1997) (URL: <http://www.labi.be.schule.de/bekum/start.html>)
- ◆ Landesinstitut für Schule und Weiterbildung LSW (Hrsg.): Aufgabe und Struktur des Landesinstitutes, 9. Auflage, Soest (1997)
- ◆ Landesinstitut für Schule und Weiterbildung LSW (Hrsg.): Software-Dokumentations- und Informationszentrum (SODIS), Soest (1996)
- ◆ Le Marché multimédia en France, bilan économique 1996 / Electre Multimédia. - 50 pages, Paris: février 1997.
- ◆ Legge Dicembre 1996, Liberalizzazione delle telecomunicazioni
- ◆ Lernwelt (Hrsg.): Minikatalog. Lernwelt-infosoft, Großhandel für Lernsoftware, Springe 1997. (URL: <http://www.Lernsoftware.de>)
- ◆ Leuther, Ralph, Immer mehr Verlage setzen auf elektronische Produkte, Handelsblatt 6.5.97, o.O., 1997
- ◆ Librairies & Multimédia, les libraires et la vente des CD-ROM éducatifs, culturels, de loisirs / Union des Libraires de France. - 27 pages, Paris: juillet 1995
- ◆ Matzner, Uwi, Wirtschaftliche Aspekte des deutschen Buchmarktes, Leipzig, 1996, (URL: www.boersenverein.de/veroeff/buchmar.pdf)
- ◆ McGreal, R. (1995) Canadian Province: Distance Learning in New "Knowledge Economy, ED, Education at a Distance #1, 1995
- ◆ Médiangles On Line 97, l'Internet en France / Médiangles. - Paris, juin 1997
- ◆ Memorandum from the Ministry of Education, Teknologistøttet undervisning - Fjernundervisning, Betænkning 1253, (Open and Distance Learning), 1993
- ◆ Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg (Hrsg), Bekanntmachung des Ministeriums für Wissenschaft, Forschung und Kunst Baden-Württemberg über das Förderprogramm «Virtuelle Hochschule» im Rahmen der "Zukunftsoffensive Junge Generation", Stuttgart, 1997

- ◆ Ministero del Lavoro, Attuazione della legge 236/93 art.9 sugli interventi di formazione professionale continua, Circolare n°174, 23rd of December 1996.
- ◆ Ministero dell'Industria, Linee di politiche industriale, Documento di contributo all'Accordo per il lavoro, 24th of September 1996
- ◆ Ministero dell'Istruzione - Direzione generale Istruzione Secondaria di Primo Grado, Bozza di Documento 15 Marzo 1997 (elaborato dal gruppo di lavoro nominato con D.D: 30/11/96 del Marzo 1997)
- ◆ Ministero dell'Istruzione, Attuazione della Direttiva n° 318, Circolare ministeriale n° 31, 19th of January 1996
- ◆ Ministero dell'Istruzione, Piano Nazionale sull'Information Technology, May 1985
- ◆ Ministero dell'Istruzione, Progetto di riordino dei cicli scolastici, 3rd of June 1997
- ◆ Ministero dell'Istruzione, Progetto di Sperimentazione Multilab, Documento di base, 1996
- ◆ Ministero dell'Istruzione, Protocolli d'intesa con STET-Telecom e RAI, 1st and 6th of December 1995
- ◆ Ministero per i Beni Culturali e Ambientali - Divisione editoria, Rapporto sullo stato dell'editoria in Italia, Quaderni di Libri e Riviste d'Italia, n.34, Istituto poligrafico e Zecca dello Stato, Roma, 1996
- ◆ Ministro dell'Istruzione, Programma di Sviluppo delle Tecnologie didattiche, Direttiva n° 318, 4th of October 1995
- ◆ Ministry of International Trade and Industry. Program for Advanced Information Infrastructure. May 1994. URL: <http://www.glocom.ac.jp/NEWS/MITI-doc.html>.
- ◆ Ministry of Post and Telecommunication: Statistics. Tokio (1997). (URL: www.mpt.go.jp/whatsnew/school_inet.html.)
- ◆ Ministry of Posts and Telecommunications. Communications Policy Bureau's map. URL: <http://www.mpt.go.jp/outline/compoli.html>.
- ◆ MONBUSHO 1994. Published by the Ministry of Education, Science and Culture. Government of Japan.
- ◆ MONBUSHO Statistics: Number of Institutions, Students and Teachers. URL: <http://www.monbu.go.jp/em09010.html>.
- ◆ MONBUSHO, Ministry of Education and Science: Educational reform moving forward. Synopsis of the Curriculum Council's Midterm report. Tokio (1998). (URL: www.monbu.go.jp/series-en/00000011/#top)
- ◆ MONBUSHO: Expert discussion round on the subject 'Advancement of the Internet Use in Japanese Schools'. Tokio (1998).
- ◆ meeting (03.12.1997): URL: http://www.mpt.go.jp/whatsnew/edu_inet980122.html
- ◆ meeting (05.02.1998): URL: http://www.mpt.go.jp/whatsnew/edu_inet980205.html
- ◆ meeting (19.03.1998): URL: http://www.mtp.go.jp/whatsnew/edu_inet.html
- ◆ Multimedia Associations of Japan. URL: <http://inetsrv.ciaj.or.jp/jmf/today/jm000277.html>
- ◆ Multimedia Societal Aspirations in a Creatively Abundant 21. URL: <http://www.ciaj.or.jp/jmf/jm000188.html>.
- ◆ Multimedia Today Menu. URL: <http://www.ciaj.or.jp/jmf/today/jm000467.html>.
- ◆ Multimedia/Disatnce Learning. URL: <http://www.ccnj.net/media.html>.

- ◆ MultiMediator Canadian Developers Directory
(<http://www.multimediator.com/directory/index.shtml>).
- ◆ Musashi Institute of Technology. URL: <http://www.adm.musashi-tech.ac.jp>.
- ◆ N.N., Anteile der Warengruppen am Umsatz 1995, Kölner Betriebsvergleich, 1996
- ◆ N.N., Buchhandel setzt auf Elektronik. DMA - Deutsche Medienbeobachtungsagentur Berlin, Iserlohner Kreisanzeiger und Zeitung 19.4.97, Iserlohn, 1997
- ◆ N.N., CBT-Akzeptanz in Deutschland und Österreich gestiegen, multiMEDIA 2/97, hightext Verlag, München (1997)
- ◆ N.N., CBT-Online: Zeit für Pioniere, CBT 1/97, hightext Verlag, München, 1997
- ◆ N.N., CD-Laufwerke vor allem für den Heim-PC, multiMEDIA 7/95, hightext Verlag, München, 1995
- ◆ N.N., CD-Rom-Laufwerke in Deutschland, Österreich und der Schweiz, in: multiMEDIA 7/95, hightext Verlag, München (1995) (URL: <http://www.hightext.de>)
- ◆ N.N., Computereinsatz im Physikunterricht, ZUM-Zentrale für Unterrichtsmedien. Freiburg, 1996, (URL: <http://www.zum.de>)
- ◆ N.N., Das Wachstum der Rechner, Universität Karlsruhe, Rechenzentrum/DE-NIC. Karlsruhe, 1997, (URL: <http://www.nic.de/Netcount/netStatOverview.html>)
- ◆ N.N., Das Wachstum des Internet, Universität Karlsruhe, Rechenzentrum/DE-NIC. Karlsruhe, 1997, (URL: <http://www.nic.de/Netcount/netStatOverview.html>)
- ◆ N.N., Datenhighway ins Klassenzimmer, Süddeutsche Zeitung 19./20.4.97, München, 1997
- ◆ N.N., Der günstigste Internet-Zugang, FOCUS Online GmbH, o.O., 1997), (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Deutscher "Edutainment" - Markt wächst auf 1,3 Milliarden Mark, in: multiMEDIA 10/95, hightext Verlag, München, 1995
- ◆ N.N., Deutschland wird größter europäischer CBT-Markt, CBT 1/96, hightext Verlag, München (1996) (URL: <http://www.hightext.de>)
- ◆ N.N., Die größten CD-Rom- Publisher im Bereich: Allgemeine Lernsoftware, in: multiMEDIA 3/97, hightext Verlag, München, 1997
- ◆ N.N., Die größten CD-Rom-Publisher im Bereich: Business-Lernsoftware, in: multiMEDIA 3/97, hightext Verlag, München, 1997
- ◆ N.N., Die multiMEDIA-Publisher-Liste: Die größten deutschsprachigen CD-ROM-Publisher 96, multiMEDIA 3/97, hightext Verlag, München, 1997
- ◆ N.N., EDV und Neue Medien, buch nrw 2/97, o.O., 1997
- ◆ N.N., Elektronisches bei Langenscheidt, Leipziger Lerche Nr. 6. Leipzig, 1997
- ◆ N.N., Erfolg mit Markenware, GLOBAL ONLINE 4/97, o.O., 1997
- ◆ N.N., Facts and figures 1997, tfpl multimedia, London (1997). (URL: <http://www.tfpl.com/webfact.htm>)
- ◆ N.N., Für die Fachverlage werden Online- Anbindungen unverzichtbar, Handelsblatt 6.5.97, o.O., 1997
- ◆ N.N., Gute Gewinne zunächst nur mit Profis, Handelsblatt 15./16.3.97, o.O., 1997
- ◆ N.N., Interessen der Online-Nutzer, FOCUS Online GmbH o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)

- ◆ N.N., Internet-Provider in Deutschland 1997, (URL: [http://yahoo/de/Handel und Wirtschaft/Firmen/Internet-Dienste/Internet-Zugriffsvermittlung](http://yahoo/de/Handel%20und%20Wirtschaft/Firmen/Internet-Dienste/Internet-Zugriffsvermittlung))
- ◆ N.N., Klett AG hat ihren Umsatz um 7% auf 412 Millionen DM erhöht, aber der Schulbuchmarkt ist hinter den Erwartungen zurückgeblieben, Buchreport Nr. 28, o.O., 1997
- ◆ N.N., Klett-Verlag sieht Zukunft bei Multimedia, Süddeutsche Zeitung 14.7.97, München, 1997
- ◆ N.N., Ladbare Lern-, Lehr- und Betriebssoftware im Internet, Zentrale für Unterrichtsmedien, Freiburg (1996). (URL: <http://www.zum.de/cgi-bin/hoturls?software>)
- ◆ N.N., Lernmarkt in Bewegung, CBT 2/96, hightext Verlag, München, 1996
- ◆ N.N., Mitgliederzahlen der Onlinedienste und Provider, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.html>)
- ◆ N.N., Multimedia im Bildungsbereich, Medienpsychologisches Forschungsinstitut Saarland e.V. im Auftrag des Ministeriums für Bildung, Kultur und Wissenschaft des Saarlandes, o.O., 1997
- ◆ N.N., multiMEDIA Liste 1997. Die größten deutschen Multimedia-Entwickler nach Umsatz, multiMEDIA 2/97, hightext Verlag, München, 1997 (URL: <http://www.hightext.de>)
- ◆ N.N., Navigo Multimedia sucht Zukunft im Systema-Verbund, Börsenblatt für den deutschen Buchhandel 9.5.1997, Leipzig/Frankfurt, 1997
- ◆ N.N., Nutzung des Computers für den Fachunterricht, in: Gesamtkonzept für die informationstechnische Bildung in der Schule, Fortschreibung 1995. Schriften des Bayerischen Staatsministeriums für Unterricht, Kultus, Wissenschaft und Kunst. Reihe B: Datenverarbeitung im Bildungswesen, Heft 8. München, 1995
- ◆ N.N., PC-Ausstattung deutscher Haushalte, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Recherausstattung und Unterrichtssituation, in: Gesamtkonzept für die informationstechnische Bildung in der Schule, Fortschreibung 1995. Schriften des Bayerischen Staatsministeriums für Unterricht, Kultus, Wissenschaft und Kunst. Reihe B: Datenverarbeitung im Bildungswesen, Heft 8. München, 1995
- ◆ N.N., Schulbuchverlag Klett drückt im Internet selbst die Schulbank, Frankfurter Allgemeine Zeitung 19.5.97, Frankfurt, 1997
- ◆ N.N., Städtematrix: Die wichtigsten Knoten, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Studenten werden abgehängt, FOCUS Online GmbH, o.O., 1997, (URL: <http://focus.de/DD/DD36/DD36G/dd36g.htm>)
- ◆ N.N., Verdient Ihr CD-ROM-Regal sein Geld?, Buchreport Nr. 17, 24.4.1997, o.O., 1997
- ◆ N.N.: Bundespräsident Roman Herzog fordert eine Debatte über die Zukunft unseres Bildungssystems. In: Die Zeit, 07.11.1997 (URL:<http://www4.zeit.de/bda/int/zeit/aktuell/artikel/herzog.txt.19971107.html>)
- ◆ N.N.: Der Internet Software-Shop der ASK/ASKnet. Akademische Software Kooperation (ASK) an der Universität Karlsruhe. Karlsruhe (1997), (URLs: <http://www.ask.uni-karlsruhe.de>, <http://www.asknet.de>)
- ◆ N.N.: Development of the computer branch - Informations on the CeBIT fair. In: Meso newsboard 03/98. (URL: <http://www.meso.odl.org/newsboard>).

- ◆ N.N.: Education, training and media competence: SIG report. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Ehe im Internet-Buchhandel. In: Süddeutsche Zeitung 29.04.1998. München (1998).
- ◆ N.N.: Für Deutschland hängen die 'High-Tech-Früchte' noch zu hoch. bild der wissenschaft, news ticker , o.O.(1997)
- ◆ N.N.: German labour market funds now open for technology-based training. In: Meso newsboard 02/98. . (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: German Telecom and Lower Saxony draw the multimedia-balance. In: Meso newsboard 03/98. (URL: <http://www.meso.odl.org/newsboard>)
- ◆ N.N.: Hope for a massive increase of multimedia jobs did not come true. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Neuer Medienbericht der Bundesregierung: Künftig mehr neue Computer als Fernseher. bild der wissenschaft, news ticker , o.O. (1998).
- ◆ N.N.: New multimedia and CD-ROM titles in Germany. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Nomura Hometrade. In: Yahoo! JAPAN - Education:On-line Teaching and Learning. Tokio (1998). (URL: http://www.yahoo.co.jp/Education/On_line_Teaching_and_Learning)
- ◆ N.N.: Offene Schule 2001. Ein Förderprogramm für bayerische Schulen zur Unterstützung von BayernOnline. Microsoft GmbH- Forschung und Lehre (1998). (URL: <http://www.microfoft.com/germany/forschunglehre/schule2001.htm>)
- ◆ N.N.: Parlamentarische Staatssekretärin Elke Wülfing: Medienkompetenz ist eine Kernkompetenz der Zukunft. BMBF press release; Bonn (1998). (URL: http://bmbf.de/archive/presse/presse98/pm_020398.htm)
- ◆ N.N.: Rütgers: Riesen-Echo auf BMBF-Gründerwettbewerb Multimedia. BMBF press release, Bonn (1998). (URL: <http://www.bmbf.de/archive/presse/presse98/pm031798.htm>)
- ◆ N.N.: Rütgers: Deutschland auf dem Weg zum HighTech-Land. bmbf press release, Bonn (1998). (URL: http://www.bmbf.de/presse/pm_010998.htm)
- ◆ N.N.: Rütgers: Multimedia zum Anfassen. Media@Komm - Städtewettbewerb Multimedia gestartet. bmbf press release, Bonn (1998). (URL: <http://www.bmbf.de/archive/presse/presse98/pm0225c98.htm>)
- ◆ N.N.: Rütgers: Start frei für den BMBF-Gründerwettbewerb Multimedia. bmbf press release, Bonn (1997). (<http://www.bmbf.de/presse/pm102297.htm>)
- ◆ N.N.: School networks support shifts slowly towards teacher training. In: Meso newsboard 02/98. . (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Teachers claim for more time needed when expected to become more active in introducing telematics. In: Meso newsboard 02/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: The Leading Edge in Electronic Education. In: milia '98, The International Content Market for Interactive Media. Conference Program. Cannes (1998). (URL: <http://www.milia.com>)
- ◆ N.N.: Virtual University. In: Meso newsboard 03/98. (URL: <http://www.meso.odl.org/newsboard>).
- ◆ N.N.: Ware via Internet. In: Nürnberger Nachrichten 05.05.1998. Nürnberg (1998).

- ◆ N.N.: Zukunftsmarkt elektronische Publikationen. Börsenverein des deutschen Buchhandels, Leipzig (o.J.), (URL: http://www.boersenverein.de/veroeff/12ia_01.htm)
- ◆ NACSIS. National Center for Science Information Systems. URL: <http://www.nacsis.ac.jp/brief/system-e.html>.
- ◆ National Education Center, Japan. Educational Training Activities. URL: <http://keinetwww.naec-go.jp/kensyu-e.htm>.
- ◆ NIME (National Institute of Multimedia Education) English Home Page. URL: <http://www.nime.ac.jp/index-e.html>.
- ◆ NIME Production Division. URL: <http://www.nime.ac.jp/seisaku/index-e.html>.
- ◆ NIME Space Collaboration System (SCS) Projects. URL: <http://www.nime.ac.jp/SCS/index-e.html>.
- ◆ NIME. Department of Educational Media Research. Theme of research. URL: <http://www.nime.ac.jp/E-Media/theme-e.html>.
- ◆ NIME. Higher Education-Projects. URL: <http://www.nime.ac.jp/HE/projects.html>.
- ◆ Noacco, D J: Multimedia Markets: A Study of Australian Content Developers. Australian Journal of Educational Technology, 11(2), 52-74, 1995
- ◆ O'Brien, C. (1996) Software Products and Computer Services: An Industry Profile. Industry Canada.
- ◆ OECD : Redefining the Place to Learn. OECD 1995.
- ◆ OECD: Education at a Glance. OECD Indicators. OECD 1992.
- ◆ OECD: Education at a Glance. OECD Indicators. OECD 1996.
- ◆ Organisation for Economic Co-Operation and Development (OECD): Lifelong Learning for All. OECD 1996.
- ◆ Pacey, L.M. & Penney, P. (1995), Thinking Strategically: Reshaping the Face of Distance Education and Open Learning.. In J.M. Roberts and E. M. Keough; Why the Information Highway? Lessons for Open and Distance Learning. Trifolium Books: Toronto.
- ◆ Paolucci U., Office 97 e il mercato italiano, Microsoft Magazine InterActive, Marzo - primavera 1997 - (enclosed CD-ROM)
- ◆ Peters, C. (1997) The Internet in Canada. Information Highway Advisory Council.
- ◆ Policy Reports/Telecommunications Council. Reforms toward the Intellectually Creative Society of the 21st Century. URL: <http://www.mpt.go.jp/po...rt1993No5/contents.html>.
- ◆ Policy Reports/Telecommunications Council. Section 1. Transition to an Intellectually Creative Society Based on Info-Communications. URL: <http://www.mpt.go.jp/policyreport1993No5/section1.html>.
- ◆ Policy Reports/Telecommunications Council. Section 2. The Implications of Info-Communications Infrastructure. URL: <http://www.mpt.go.jp/policyreport1993No5/section2.html>.
- ◆ Policy Reports/Telecommunications Council. Section 3. Characteristics of Fiber-Optic Networks. URL: <http://www.mpt.go.jp/policyreport1993No5/section3.html>.
- ◆ Policy Reports/Telecommunications Council. Section 4. The Goals for Building Info-Communications Infrastructure. URL: <http://www.mpt.go.jp/policyreport1993No5/section4.html>.

- ◆ Policy Reports/Telecommunications Council. Section 5. Developing and Introducing Applications. URL: <http://www.mpt.go.jp/policyreport1993No5/section5.html>.
- ◆ Policy Reports/Telecommunications Council. Section 6. Establishment of Subscriber Fiber-Optic Networks. URL: <http://www.mpt.go.jp/policyreport1993No5/section6.html>.
- ◆ Policy Reports/Telecommunications Council. Section 7. Recommended Measures Which Should Be Effected by the Government. URL: <http://www.mpt.go.jp/policyreport1993No5/section7.html>.
- ◆ Press release, Osservatorio Alchera (Alchera Strategic Vision), "Tendenze, attori, evoluzione e utilizzo delle nuove tecnologie in casa e in ufficio", Milano, 21 Marzo 1997 - Internet address: <http://www.alchera.it>
- ◆ Program for Educational Reform. Verbal comments on the Program, Program Outline. URL: <http://www.monbu.go.jp/series-en/00000001/>
- ◆ PWC Yokosuka Japan Reports & Statistics. URL: <http://www.pwcyoko.navy.mil/rpt/>
- ◆ Rapport de la Task Force "Logiciels éducatifs et multimédia" / Commission européenne Task Force Recherche - Industrie "Logiciels éducatifs et multimédias" . - Bruxelles: juillet 1996.
- ◆ RAPPORTO ISFOL 1997, Formazione e occupazione in Italia e in Europa, Franco Angeli, Milano, 1997
- ◆ Roberts, J. (1995) Survey of Telematics for Education and Training Volume III. Commission of the European Communities Directorate-General for Telecommunications, Information market and Exploitation of Research.
- ◆ Rossipaul Kommunikation GmbH (Hrsg.): Neue Medien. München (1997)
- ◆ Rossipaul Kommunikation GmbH (Hrsg.): MultiMedien. Gesamtprogramm 1996/97. München (1996)
- ◆ Rüttgers und Sommer: 'In den nächsten Jahren alle Schulen ans Netz!' Telecom und BMBF stellen weitere 100 Millionen DM zur Verfügung. BMBF press release, Bonn (1997). (URL: <http://www.bmbf.de/presse/pm121697.htm>)
- ◆ Samborski, R.D. (1997) «Technology: the Challenge» conference proceedings from Leading Edge Training Technologies 5th Annual Conference. Victoria, British Columbia.
- ◆ Sander-Beuermann, Wolfgang: Internet-Zugänge in Deutschland. Hannover (o.J.). (URL: <http://www.rrzn.uni-hannover.de/inet-zu-de.html>)
- ◆ Schenkel, Peter, Educational Multimedia in the European Union and in the Main Third Countries. Annex to the Task Force Report of July 1996, European Commission, o.O., Germany, 1996, (URL: <http://www2.echo.lu/mes/en/countrep/countrep-de.html>)
- ◆ Schmidhäusler, Fritz J., Daten auf CD-Rom werden online aktualisiert, Börsenblatt für den deutschen Buchhandel 6.5.97, Leipzig/ Frankfurt a.M. (1997). (URL: <http://www.buchhandel.de>)
- ◆ School Curriculum and Assessment Authority: Higher Education in the Learning Society (The Dearing Report), July 1997. ISDN 0-858-38254-8.
- ◆ Schroedel Verlag (Hrsg.): Lernen mit Spaß am Computer. Schroedel Verlag GmbH, Hannover (1997) (URL: <http://www.schroedel.de>)
- ◆ Schulen ans Netz e.V. (Schools to the Network).Rüttgers und Sommer geben Startschuß für die dritte Ausschreibungsrunde. Press release, February 1998. (URL: <http://www.san-ev.de>)

- ◆ SchulWeb: SchulWeb-Statistik vom 06.Mai 1998.Berlin (1998). (URL: <http://www.schulweb.de/statistik.phtml>)
- ◆ SEMIS, Zentralstelle für Computer im Unterricht: Modellversuch «Schulischer Einsatz multimedialer interaktiver Systeme«, Augsburg (1997) (URL: <http://www.zs-augsburg.de/semis/semis.html>)
- ◆ Server der Zentrale für Unterrichtsmedien im Internet (ZUM). (URL:<http://www.zum.de>)
- ◆ Server der Deutschen Gesellschaft für Erziehungswissenschaft. (URL: <http://www.educat.hu-berlin.de/dgfe>)
- ◆ Server der Hochschul-Informationssystem GmbH (HIS). (URL: <http://www.his.de/abt3/proj/676/index.html>)
- ◆ Server der Initiative «Schule im Netz«. (URL: <http://www.sn.schule.de/schulen/land.html>)
- ◆ Server des Vereins der Kommunikations- und Beratungsstellen «Schulen ans Netz« (URL: <http://www.san-ev.de/>)
- ◆ Siemens-Nixdorf: Self-Learning Architecture from Siemens Nixdorf. Innovative Learning Made Easy. Nürnberg/München (1996).
- ◆ Stahmer, A. (1992) Commercial Education and Training - Industry Analysis. Industry Canada
- ◆ Statistisches Bundesamt (Hrsg.), Datenreport 1997. Zahlen und Fakten über die Bundesrepublik Deutschland, Bundeszentrale für politische Bildung, Bonn, 1997
- ◆ Stephen Rickard, Jenny Ertle, Robert Ertle: Reaching the Multimedia Market. In: Financial Times, Media and Telecoms. London (1998)
- ◆ Strategic Developments for the European Publishing Industry towards the year 2000.: Executive Summary / Commission européenne DG XIII/E. -54 pages, Bruxelles, Luxembourg: 1996
- ◆ Surfen macht den Meister. In: Süddeutsche Zeitung 06.05.1998. München (1998).N.N.:
- ◆ Systema Verlag(Hrsg.): Multimedia für höchste Ansprüche. Verlagsprogramm. München(1997)
- ◆ Task Force on Educational Multimedia, Country report on Greece
- ◆ The Ministry of Education, the Ministry of Research, the National Association of Local Authorities and the municipalities of Copenhagen and Frederiksberg, A budget analysis from the Ministry of Finance, 1996
- ◆ The model for Japanese education in the perspective of the 21st century. First report by the Central Council for Education. URL: <http://www.monbu.go.jp/special-en/00000001/>
- ◆ The Multimedia and CD-ROM Directory / TFPL Publishing, february 1997.
- ◆ The relationship between the University of the Air and the National Institute of Multimedia Education. URL: <http://www.nime.ac.jp/overview/objectives-e.html>.
- ◆ The White Paper: Excellence in Schools and the Dearing Report.
- ◆ Thiele, Günter A.: Produktive Medienarbeit in der Schule - Thesen und Erfahrungen. GMK-Rundbrief Nr. 34 (1993)
- ◆ Thomson Publishing International (Hrsg.): Gesamtverzeichnis Frühjahr/Sommer 1997. Bonn (1997)

- ◆ TVOntario (1997) TVO's Virtual Classroom: Get Connected (unpublished paper).
- ◆ Valdani Prof. E. - Mandelli Prof.ssa A., SDA Bocconi, Milano, La domanda di servizi Internet in Italia, 1996 - Internet address: http://www.tin.it/osservatorio_bocconi/ricerca/
- ◆ What is Laboratory for New Software Architectures? URL: <http://www.mgt.ipa.go.j...T/public/outline-e.html>.
- ◆ What is Open Fundamental Software Technology Project? Aiming at Advancement of Open Platform in the Future. URL: <http://www.ipa.go.jp/OFSTP/ofstp.html>.
- ◆ Wilking, Thomas, EP läßt auch Große Anlehnung suchen, Buchreport Nr. 20, 15.5.97, o.O., 1997
- ◆ World Statistics/Data published in Japan. URL: <http://www.jetro.go.jp/world/>
- ◆ World-Wide Web Access Statistics for ATLAS-Japan. URL: <http://arkhp1.kek.jp/managers/global/miscellaneousInfo/accessStat.src7ACCESSStat9410.html>.
- ◆ Zimmer, Jochen, Profile und Potentiale der Onlinenutzung, Media Perspektiven 9/96, S. 487-92, o.O., 1996
- ◆ Zincone, Maria Rosaria, Europa, Decolla il consumer, in Il Sole 24ore informatica, 3 Aprile 1998
- ◆ Zincone, Maria Rosaria, Italiani, zero in informatica, in Il Sole 24ore informatica, 20 Febbraio 1998
- ◆ Zincone, Maria Rosaria, L'Italia alla corte di Internet, in Il Sole 24ore informatica, 23 Gennaio 1998

