



Stimulating the development of Minority Language Digital Content

A report prepared by John Hegarty
Centre for Research in Information Technology in Education, Trinity College, Dublin 2

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Introduction

Schools IT 2000

In December 1997, the Department of Education and Science (DES) launched its policy framework document, Schools IT 2000 to promote the integration of ICT into the Irish curriculum. The National Centre for Technology in Education (NCTE) was established under the aegis of the DES to manage the implementation of the initiative, to develop ICT policy proposals and to provide policy advice to the Department of Education and Science. Since then there has been a significant increase in the use of information technology in schools and the level of hardware and software present in Irish schools continues to increase.

This increased awareness and usage of ICT has highlighted the lack of educational digital content appropriate to the Irish Education System. The situation for teaching Irish and teaching through the medium of Irish is even more acute. This is a common problem being faced by all minority languages.

Digital Content

The use of digital content in schools has increased significantly, particularly in the last two years. Many schools now publish their own websites on the Internet. Students are increasingly more familiar with electronic communication using email and the Internet. They are confident in their use of digital media like CDROM and DVD. They use digital cameras to add images to their projects created with word processors or other digital authoring packages. Digital content can be distributed and used in a variety of formats and for the purposes of this paper includes CD-ROM, DVD, Internet web sites along with possible future media like digital television.

Stakeholders

Governments and other funders of education, educational institutions, publishers and broadcasters, channel owners/operators and technology/software companies: all these key stakeholders share a common experience that none can succeed alone in delivering education in a networked mixed-media environment. Collaboration between the different types of organizations becomes essential.¹

The development of the global information society has a profound impact on the educational market and places new demands on the creation and delivery of educational materials and services. Digital communication networks in schools, homes and offices, offer a range of opportunities for learning and are fast changing the way in which education takes place.¹

IT 2000 in Ireland is just one example of the many national responses to this development around the world. This paper examines

- What actions and policies are being implemented in other countries for national curricula in general and for minority languages in particular and what lessons we in Ireland can learn from them.
- Ways in which the quality and quantity of software/digital content can be improved and expanded in Ireland in an ongoing and sustainable way.
- The role that publishers, developers and national agencies can play in tackling the need for digital content for the Irish curriculum.

Section A

The Educational Software Market

1. Education Market - Global

Overview

This section is in two parts. The first looks first at the global market trends in the educational software industry, focusing on;

- Market Consolidation
- The Role Of The Internet
- Trend Towards Localization
- The Need For Regulatory Framework

The second sections moves to the situation in Ireland and considers;

- Market Size
- Software Used In Irish Schools
- Distributors And Developers
- Issues For Developers And Distributors In Ireland
- Asset Holders
- Media Companies

1.1 Global Market Consolidation

One of the most striking trends in the education software industry is the degree of market consolidation that has taken place in the last five years. Many of the bigger companies of the 80's and 90's have been bought out by their competitors. The development of CD-ROM technology brought about a huge increase in educational software being marketed in this format. This caused a glut in the market, which forced prices down. Many companies found that despite rising sales figures, net profit margins went down.

Arum Fuchs sold Edmark, some of whose products have been localized for the European market by Iona Soft in Dublin, to IBM for \$130 million in 1996. In August 2000 IBM sold it to Riverdeep in exchange for \$80 million in Riverdeep stock.

The country report on the US prepared for the European Commission Task Force on Educational Multimedia reported Broderbund to be the top selling CD-ROM publisher in the US in 1996. In 1997, they were bought out by the Learning Company who also bought out Mindscape, the 6th ranked publisher of CD-ROMs in the US in 1996. The Learning Company was then bought out by Mattel. Mattel Interactive made a pre-tax loss of \$206 million in 1999. While Mattel maintain that they will continue to sell software, they have indicated a desire to sell off the Learning Company.

Dorling Kindersley, another large software publisher, made several acquisitions in recent years - Henderson Publishing, a UK-based publisher of illustrated children's mass market books in 1995; Hugo, a publisher of language-learning books and audio tapes in 1996; and Acacia Interactive Ltd, a UK-based software developer and publisher of educational CD-ROMs in 1997. In May 2000 Dorling Kindersley was acquired by Pearson plc, an international media company with businesses in education, strategic business information, international television production and consumer publishing.

Pearson, had bought Mindscape, a multimedia company, in 1994 for \$503m, only to sell it in 1998 for \$150m to the Learning company.

According to an EU report "Designing Tomorrow's Education Promoting Innovation With New Technologies", building up a provision of educational multimedia software and services of good quality presupposes partnership between the public authorities and the industry, increasing investment and a change in practices. The report went on to describe the process as complex, being simultaneously technical, cultural, economic, social and institutional. At the end of 1998, European publishers felt that the sums earmarked by the public authorities were too small to allow a genuine market to get off the ground²

1.2 The Role Of The Internet

The growth of the Internet since the mid 1990's holds great promise as a means of distribution and access to educational digital content for both software developers and schools alike. Many schools publish their own content, be it information about their own school or projects they are involved in either on their own or in partnership with schools around the world. Many companies/institutions are developing educational content for the web and education portals like Scoilnet are on the increase.

The Domain Survey attempts to discover every host on the Internet by doing a complete search of the Domain Name System. According to the Internet Software Consortium there were over 72 million domain names in operation by January 2000. This represents an increase of over 65% in the size of the Internet in one year.

Web Vs CD-ROM

Many companies see advantages in moving their business model from a license-based operation to an online subscription-based one. Software can be continuously updated without the need for a major re-release. Issues of distribution and platform are greatly simplified. Piracy is less of a problem. Technical support and software demonstrations can take place online. Datamonitor predict that 25% of the home multimedia market will be online by 2005 ¹ and there is evidence of this trend in the education market also.

Riverdeep founded in 1995 is a good example of such a company following this line. It is jointly headquartered in Dublin and Cambridge, Massachusetts. They acquired Logal, an Israeli Maths and Science software publisher in July 1999 for over \$5.2 million. In June 2000 they made a deal with AOL who will effectively showcase some of their software as part of AOL's Education section. In June they also signed a distribution agreement with UK firm Research Machines, estimated to be worth \$15-20 million. This will enable Riverdeep to distribute its products through RM's UK network. They also acquired US language software company, ED-Vantage Software for \$20.1 million in July of this year. They acquired Edmark from IBM and have expressed their intention of converting Edmark's content for publishing on the web. Edmark own over fifty multimedia titles aimed at younger children. Riverdeep aim to move all their content to the web and are moving towards an entirely web based subscription based licensing model rather than distribution via CD/DVD.

The BBC is proposing to start an online education service in September 2001. They aim to cover most of the curriculum for mainstream subjects for all primary and secondary students of all abilities. The BBC estimate that their existing "Bitesize" educational content was used by 2/3 of all 15-16 year olds in the UK for revising for exams. Bitesize offers small pieces interactive multimedia content which focus on specific aspects of the curriculum. They aim to bridge the home and school market divides with content that will satisfy the different demands of both. They are also developing online educational content in Welsh an example of which can be found at

<http://www.bbc.co.uk/wales/catchphrase/catchphrase2000/webguide.shtml>.

They are providing online Irish language content through BBC Northern Ireland, which can be found at <http://www.bbc.co.uk/northernireland/blas/>. Bitesize has been localized in English for Scottish education and Scots Gaelic content can be found at <http://www.bbc.co.uk/scotland/alba/>.

Market not ready for web dominance

While many companies see the advantages the internet can offer they cite present day access levels as being too low to sustain viability in Europe where the market is also greatly fragmented both by language and culture. They are developing web resources but see the CD as their main means of distribution. Others are developing web resources that compliment or update the CDROM based content. Britannica and Havas are examples of companies following this line.

For the time being, sales of educational CD-ROMs far outnumber those of online materials. In the US, for example, schools spent \$13 million on online subscriptions in 1998, compared with \$340 million on stand-alone or modular software and \$218 million for comprehensive courseware, which is usually delivered on CD-ROM, according to Simba Information. ³

1.3 Trend Towards Localization

Early multimedia software tended to be very country specific. Encyclopedia CD-ROMs developed in America, for example, had a very strong American bias. Multimedia encyclopaedias would contain several video clips etc of American Presidents but few or no examples from other countries. To a certain extent this reflected the size of the market in America relative to the rest of the world. As markets developed in other countries, demand for international content grew and many products became available with a basic level of internationalisation where mid-Atlantic accents replaced American ones and there were increased levels of content to better represent other countries. Titles were marketed as being International versions and products in languages other than English became more prevalent.

This trend is continuing with most multinational companies increasingly becoming involved in localization of their products for national markets to meet the demands of an increasingly more sophisticated user base.

This trend has not been strong in Ireland due to the size of the market and the fact that English is the primary spoken language. If the primary language in Ireland were not English then the need for localization would be more obvious. There is however a pressing need for the development and/or localization of interactive software/digital content for the Irish education system in general and for teaching Irish and teaching through the medium of Irish in particular.

Localization for the Irish market is looked in more detail in sections 2.4 and 4.1.

1.4 The Need To Consider The Regulatory Framework

The OECD in a background paper on “New Developments In Educational Software And Multimedia” identified a need to examine the regulatory framework which affects the supply of educational multi-media software. ¹ Making changes to this can encourage the development of educational software For example,

- changes to the rate at which VAT is charged on educational software for example would lower the cost to schools and help to increase sales.
- Another suggestion is to extend copyright exemption rules to educational use of electronic media, though IPR needs to be protected.

Key Points from section 1

- The trend is towards fewer and bigger software developers in a very competitive market.
- Software developers are merging with content developers to create education software.
- Multinational software developers tend to target the home education / edutainment market rather than the school market.
- Companies are keeping a close watch on the net and the opportunities it offers. Many are developing web resources but believe that sector of the educational market is not yet viable while some are moving towards a purely web subscription licensing model.
- There is a trend towards increasingly localized products.
- Making changes to the regulatory framework that affects supply can encourage the development of educational software.

2. The Education Software Market in Ireland

Overview

This section concentrates on aspects of the education software/digital content market in Ireland including:

- Market size
- Software used in Irish Schools
- Distributors And Developers
- Issues for Developers and Distributors in Ireland
- Asset holders
- Media Companies

2.1 Market size

According to figures for 1998 from the Department of Education and Science there were 3592 Primary schools with 470,000 pupils and 763 post-primary schools with 371,000 pupils.

International software companies from the UK and US dominate the market in Ireland. Estimates in the current size of the market range between IR£3-5 Million. There are no local education authorities in Ireland as there are in some other countries, the UK for example. Schools receive their software budget directly from the Department of Education and Science in the form of software capitation grants. Individual schools make all decisions on what software should be bought and from what source it should be bought. In addition to NCTE software grants, schools obtain funding from a range of other sources such as fund-raising, library grants etc. to fund software purchases.

According to NCTE data, the total number of computers in schools is up 65% since 1998, to a total of 59,561. The average primary school now has 8.7 computers, while the average for post primary is 42.7. 75% of teachers have had some IT Training.

	Primary	Post primary	Total
Total number of computers reported	24,830	26,477	51,307
Response rate	86.4	85.9	
Estimate of total numbers assuming response is representative of population. (Total*100/response rate)	28,738	30,823	59,561

Table 1 Estimate of total number of computers (NCTE Data)

	Primary	Post primary	Total
Total number of computers reported	24,830	26,477	51,307
Number of schools	2,861	620	3,481
Average per school	8.7	42.7	14.7
1998 Average per school, from Telecom survey.	3.8	31.0	

Table 2 Computers per school (NCTE Data)

	Primary n=2755	Post primary n=595
Average computer pupil ratio	17.7	13.0
Standard deviation	20.3	7.3
<i>1998 Average, from Telecom survey.</i>	35	16

Table 3 Computer pupil ratio (NCTE Data)

Along with other EU nations Ireland has committed itself to connecting all classrooms to the Internet by the end of 2002 as part of the eEurope initiative. ⁴

According to IDC, Irelands IT market is expected to grow at an average compound rate of 12% until 2004. Ireland is described by IDC as an emerging IT economy where there is a shift from spending on hardware and infrastructure towards spending software and content, mirroring trends in more advanced IT economies. ⁵

2.2 Software used in Irish Schools

Software used in Irish schools is predominately of US and UK origin from companies like Mattel (Broderbund, The Learning Company, Mindscape), Granada-Learning, Havas Interactive, Dorling Kindersley, Anglia, Sherston and Microsoft among others. Much of the software being used in Irish schools is designed more for the home education market than for use in the classroom.

Software being used falls generally into one of two categories.

1. Content Rich – for example
 - a. Databases like Encarta from Microsoft and History of the World from Dorling Kindersley
 - b. Interactive Story books like Arthur's Teacher Trouble from the Learning Company
 - c. Interactive content like Thinkin' Things from Edmark and Phonics and Spelling from Longman
2. Content Free – for example
 - a. Word Processors (predominately Microsoft Word)
 - b. Authoring tools like Hyper studio
 - c. Learning environments like Geometers Sketchpad and Mathview.

2.3 Distributors And Developers

There are several distributors of Educational software in Ireland ranging from specialist education software distributors like Diskovery to distributors whose main business has traditionally been textbook publishing and distribution, like EDCO and Carroll Educational Supplies. Textbook publishers are also looking at getting more closely involved in software development and/or localization, though are wary of venturing into an unproven market.

One example of this is the partnership between Carroll Education Supplies and Gael Linn to localize a Granada product, Junior Writer Workshop, into the Irish language.

There are a small number of indigenous software developers producing software for the Irish education system in Irish and/or in English. These include companies like Fios Feasa, a company based in the Gaeltacht in Kerry producing Irish language and bilingual software, and Rosk E-Systems, a company based in Dublin producing educational software for French, German, Irish and Mathematics.

2.4 Issues for Developers and Distributors in Ireland

The Market

The primary obstacle to the development of education software for the Irish market that companies identify is the size of the market. It is only in recent years that schools have been getting ongoing funding for buying software. That along with the fact that teacher training has only started in a systematic way over the last two years has resulted in a market which is in early stages of development. Good educational software is expensive to produce (anything from £20,000 to £250,000) and schools who are traditionally used to stretching limited financial resources are slow to invest in software rather than hardware. The policy of providing annual funding specifically for software is helping to overcome this. In 1999 £4 per pupil was distributed to 2nd level schools though schools were allowed to spend some but not all of their allocation on hardware where this was more appropriate to their needs.

Many teachers/schools have bought software without a full understanding or appreciation for how they were going to integrate it into the curriculum. Much of this software was more suitable for use at home and many schools are reluctant to spend more money on software that they don't understand how to use. The licence model where schools/teachers expect to buy a single CD for circa £20-30 in the same way as you would buy a video will not sustain an educational software market in Ireland. Schools have been slow to enter into site licence agreements that would give software developers the funding that is needed to support a sustainable market.

Teachers have long been interested in content-free software where students/teachers author their own materials either in English or Irish. Teachers who buy this kind of software tend to be those with high levels of IT skills.

Developers see the home education market as being more viable than the school one. This unfortunately results in products that are not always readily suitable for use in the classroom. This can be alleviated somewhat where a good teacher support pack is developed to show teachers how the software can be integrated into the curriculum. The Learning Company is an example of a developer following this line in the US. TAG and Havas Interactive have also produced support packs for their products in a variety of languages and Havas Interactive are actively exploring the minority language market with some development already underway in Catalan.

Distributors in Ireland find that software sells more by word of mouth than by any other means. Teachers rely on the recommendations of their peers more than any other source of information. This can result in teachers looking for software long after it has gone out of production and can make it difficult for newer products to establish themselves. Despite the higher levels of penetration of hardware in second level schools, distributors find that primary schools are more

likely to buy software. One reason given for this is that the education system at second level in Ireland is strongly focused around the Junior and Leaving Certificate examinations. Teachers at second level are very reluctant to buy software that doesn't immediately fit into the curriculum. That coupled with the fact that there are over four times as many primary schools as secondary schools makes the primary level a more viable market.

Irish Language and Localization

In the area of Irish language content/software, they see a potentially viable market for a small number of high quality products to teach the language itself to students in English speaking schools but that without state assistance commercial realities weigh against software for teaching other subjects through the medium of Irish. The audience for education software in Ireland can be broken into three categories.

1. Software for teaching and learning in English-speaking schools.
2. Software for teaching and learning in Irish-speaking schools.
3. Software for teaching and learning the Irish language itself.

Developers who have been involved in localizations of their products in other countries hold that it is important to have language experts and teachers from that country closely involved in the localization. One developer that developed a product for the Irish market without having access to reliable language expertise and without close cooperation with teachers found that development time and associated costs went up dramatically. They found that they were reacting to input from teachers and language experts long after they had initially believed the product to be complete and recognise now that teachers and language experts should have been integrated into the development team from the outset. Eventually development costs grew so high that they couldn't sell enough copies of the software to recoup their initial investment.

2.5 Asset holders

There are a number of institutions in Ireland who own assets which if digitized would provide very valuable content which could be used in the development of education content/software both in English and in Irish. The Library Council ⁶ identify Trinity College Library (The Book of Kells), the National Photographic Archive, RTE and others as having such assets. For the Irish language in particular they identify the Folklore Commission, the James Hardiman Library, the Irish Joint Fiction Reserve Scheme, the Zimmer Collection as well as other institutions as having such assets. The Library Council sees a need to coordinate the digitisation of assets using common standards and agreed technologies. They are also concerned with the speed of obsolescence of technology and see that there will be a need to support obsolete technology so as to preserve access to digitized assets. They also refer to a UK study that found that

“ The legal framework in which digital information is used is often distinct from other media. Increasingly, digital information objects are not ‘owned’ by a user or repository but licensed from their creators and their use governed by contractual terms. The rights and terms attached to a digital object when it is created or acquired may fundamentally control how or whether a repository can preserve it or make it accessible to future users.” ⁷

Similarly, other institutions hold assets that if digitized could readily be used in the production of interactive software/digital content in both Irish and English. These include the National Museum and the National Art Gallery to mention just two.

The SCRAN development in Scotland, examined in more detail in section 4.3.5, may provide a possible model for Ireland.

2.6 Media Companies

RTE are in the early stages of developing a digital service, which will include a digital channel for education. Online content will be developed in association with this channel and possibly made available in association with Scoilnet, the education portal developed as part of a public private partnership between Intel and the NCTE. This content will include Irish language content.

TG4 have also developed some resources for education including some interactive bilingual online content, but don't intend to compete with RTE as they see this as a duplication of effort in what is already a small market.

Educational Irish language digital content is also available from BBC Northern Ireland, which can be found at <http://www.bbc.co.uk/northernireland/blas/>. One example of the content here is Giotá Beag! (A wee Bit!) which is a series of online lessons for learning the Irish language. Other examples include content on astronomy, cookery and science.

Section B

Education Software Development In Other Countries

3. Minority Languages

According to Krauss (1992a), as many as half of the estimated 6,000 languages spoken on earth are "moribund"; that is, they are spoken only by adults who no longer teach them to the next generation. An additional 40 percent may soon be threatened because the number of children learning them is declining measurably. In other words, 90 percent of existing languages today are likely to die or become seriously embattled within the next century. That leaves only about 600 languages, 10 percent of the world's total, that remain relatively secure for now. This assessment is confirmed, with and without detailed estimates, by linguists reporting the decline of languages on a global scale, but especially in the Americas, Africa, Australia, and Southeast Asia (Robins and Uhlenbeck 1991; Brenzinger 1991; Schmidt 1990).⁸

In Europe the strongest minority languages include Irish, Welsh, Scots Gaelic, Breton, Catalan, and Basque. The Rand report on "The Market for Educational Software" (1995) quoted one publisher as saying "You can lose money in education software, even when you corner 100% of the market". When one considers that this publisher was talking about the English speaking market of North America then one can readily understand why there is little commercial activity in the minority language software/digital content development sector as a whole and less still in the field of education.

A major business challenge is to determine what is local and what is global. Educational content cannot be made generic to fit a uniform global demand, but materials have to be hand-crafted to work within local contexts and individual requirements. How then can publishers and software companies best respond to this challenge and achieve a sustainable market? This is especially a problem for smaller nations and minority languages. **1**

While something in the order of 50 million people speak languages other than the national language of their country, the market is extremely fragmented. If the applications from Cyprus, the Czech Republic, Estonia, Hungary, Poland and Slovenia for admittance to the EU are accepted, it will add a further 33 linguistic minorities from languages and cultures as diverse as Arabic and Ukrainian.

There is scope for cooperation among minority languages for producing new products designed from the beginning to be localized into several languages. The Fabula project discussed in more detail in section 4.3 is a good example of what can be achieved if such an approach is taken.

4. Development Models For Interactive Software/Digital Content

Overview

This section looks at localization and development models for software/digital content and the associated issues and concerns that need to be addressed by those developing software/content for the Irish education system. Attention will be given to;

1. Localization
 - Content and Language
 - Teacher support

2. Development of new products
 - Grants
 - Competitions
 - Public Private Partnerships

Then examples are examined to illustrate what is being done in other countries using these development models as well as other kinds of development that are helping to provide quality digital content for education.

The section finishes with a summary of some of the lessons that we in Ireland can learn from developments abroad.

4.1 Localization

Localization takes place where a product is developed for one market and then reengineered so that it is suitable for sale in another market.

4.1.1 Content and Language

Localization issues for minority languages and many European national languages are very similar. Localization of an educational product developed for one market for use in another has two main aspects.

1. Content localization
2. Linguistic localization.

Ideally a user of a localized product should not be aware that localization has taken place. Content such as pictures, videos etc. need to reflect the culture of the country. References to newspapers, television, history, current events etc. should be to ones indigenous to the country wherever possible or appropriate. References to the educational system should be to the curriculum and exam structure of the country.

The other main aspect of localization is the translation of the content into the language of the country. Where there is more than one language in use in the country then this also needs to be taken into consideration. Language experts need to be on board from the outset to ensure accuracy and correctness of the translations taking place along with appropriateness of the standard of language being used for the end user

Software developers who intend to sell their product in a number of countries need to take the following considerations on board.

- It is best to write the software with translation in mind, ie put all text in a separate file that can be easily extracted for translation. Alternatively flag the software so that text can be easily identified in the code
- Often other languages are longer than English, which can cause problems with, screen layout - the font can be altered but you need to start off with a large font size.
- Voice recordings need to be well organised and you'll need the help of a native speaker to ensure that intonations etc. are correct.
- Graphics with text might need to be altered, so keep originals so that you can change them.
- Some testing needs to be done by native speakers to ensure that everything is correct.
- Involve curriculum experts, teachers and national ICT agencies from the country you are localizing for from the outset. Bringing them on board later or not at all will slow down the development process, increase costs and result in a product that may not meet the needs of teachers and/or students.

4.1.2 Teacher support

Education software developers have increasingly seen the need to show teachers how their products should be used in the classroom. Clearly identifying how a piece of software meets a need within the curriculum makes a teacher more willing to use, and therefore more willing to buy, the software. A good support/auxiliary resource pack will show what activities can and/or should be done before using the software, while using the software and after using the software. It will also show how the software fits in with the curriculum and how it can integrate with other subjects and areas not specifically covered by the program. When localizing an educational product it is also important to localize the support pack.

Simply localizing the support pack will offer a basic and cost effective method of localizing where there are not sufficient funds for more comprehensive levels of localization

4.2 Development of new products

Commercially self-financing software will meet certain needs within the education system but financing from public bodies will be required for others. There are a number of ways of promoting the development of educational software. The primary ones being

- Grants
- Competitions
- Public Private partnership

4.2.1 Grants

In the UK grants helped fund an embryonic educational software industry in the early 1980's administered by the NCET (now known as Becta). Grants are now more often used to fund research at national and European level. They afford the researcher/developer considerable freedom to work in their area of expertise without having to worry about commercial viability, marketing distribution etc.

4.2.2 Competitions

Portugal and Canada are examples of two countries that have used competitions to stimulate the development of educational software/digital content. Competitions are run where a public body identifies a need for a particular piece of software, publishes a tender document and allows private companies to compete for the development. When drawing up such a tender document the following considerations, among others, should be made;

- It is crucial that the tender document spells out very clearly and precisely what the intended specifications of the software/content should be. Failure to do so could result in a high level of frustration on both sides as the software developed would be unlikely to match the required outcome of the public body.
- Specifications need to include precise information about who the target audience is, the platform the software is to run on etc.
- Close attention needs to be given where there are language requirements, as there would undoubtedly be in relation to the Irish language.
- The tender document should encourage developers to form the kind of development team that produces good education software/content. Development teams should include programmers, educationalists/teachers and language experts if they are to succeed. (One company I looked at were in effect producing a product for the education market by digitising a retiring teachers lifetime of expertise and the paper based resources he had developed into an interactive online learning environment.)
- Copyright stays in the hands of the developer and they are free to distribute the software on a commercial basis.

Payment could be made by a guarantee to purchase a set number of CDROMs/licences. This would help to offset the risk for the developer. Copies purchased could be distributed through the Teacher Centres. This system would also give the winning software a strong recommendation that would help sales to schools.

The danger with competitions is that it could create unfair competition in the market. Any company would find it hard to compete with another company with state funding.

4.2.3 Public Private Partnerships

Public-private partnerships are a vehicle for drawing together the resources and know-how that are needed to expand the range and quality of software/content. Public private partnerships in education in Ireland are not commonplace at primary and secondary level, though they have a

role to play in the development of software/content. The education portal site “Scoilnet” is the result of a public-private partnership between the NCTE and Intel.

Although each partnership is unique, they typically share some common characteristics.

- They bring together public- and private sector partners.
- Partners work together toward shared goals or objectives.
- Each partner contributes time, money, expertise, and/or other resources.
- Decision-making and management responsibilities are shared among the partners.

Successful partnerships follow similar principles that guide and support their activities. These principles are relevant to a variety of initiatives. They should;⁹

- **Have clear goals.**
- **Aim to achieve positive results and regularly measure progress.**
- **Be broad-based and include key stakeholders from the beginning.** Partnerships are most effective when they are able to draw from a broad range of perspectives, resources, and expertise. Partnerships can gain broader public and private support for their efforts through the constituencies that each partner represents and supports.
- **Establish clear governance structures that define partner roles and responsibilities.**
- **Set and adhere to ground rules that guide the partnership in its work.**
- **Enable all partners to benefit by drawing on their strengths and contributions.** Each partner brings different strengths, knowledge, and resources to the partnership. Sensitivity to these attributes will cement working relationships among partners and allow the partnership to draw on a broad range of resources and expertise.
- **Work to maintain momentum and sustain the efforts over time.** The most successful partnerships plan right from the beginning for how they will maintain momentum and sustain their efforts. Planning for financial sustainability, celebrating successes, and creating a sense of shared ownership and collective purpose increase the likelihood that partners will stay involved over the long run.

4.3 Examples from other countries

4.3.1 Grants

In the early 1980’s the UK government used grants to fund initiatives by those with an interest in education and computing to develop software that could enhance learning in some way. This grant aid encouraged the development of CDs at a time when the technology was very new. A vicious circle was operating where software developers were not investing in software production for this medium as schools did not have the technology. Schools weren’t buying the technology because there were no good CDs available. They found that by providing grants¹⁰

- This fuelled an embryonic educational software industry. The result was a wide array of small applications, which could be highly effective in revealing, exploring or reinforcing a range of teaching points.
- Explicit criteria for software quality were not offered. There was an assumption that, by combining expertise in education with expertise in computing, educationally effective software would result. Research and evaluations from that time suggest that to some

extent this was the case, but that the key factor in the impact of such software on learning was the way in which teachers managed the integration of these resources into the learning experience.

- This was not, however, a well documented set of skills. Materials describing things that could be done with computers abounded, but the relationship to the rest of the learning experience was ill defined.
- The CD-ROM partnership scheme provided grants of up to £70,000 for 13 developers. This produced 12 good products in the early era of CDs that stimulated the production of a number of others.¹¹

Among the advantages in using grants at that time identified in the UK were that

- The market was stimulated in the right direction
- They encouraged a break in the vicious circle mentioned above.
- They encouraged a climate of change in those who did not get cash

Disadvantages included that

- The industry does not like subsidising competition, they claim un-level playing field
- One must accept that one or two developments (out of a largish field) will probably fail.
- That they will mainly be late (it is easier to specify hard deadlines when you pay for everything)

There are a number of projects taking place at European level that are grant funded.

Fabula

Fabula is a multi-disciplinary software development project involving principal project partners in the fields of bilingual education and literacy, human-computer interaction, interface design, typography and software development from the University of Reading and the University of Brighton in the United Kingdom and DTP Workshop in Dublin, Ireland. It was funded for two years from July 1998 by the EU Multimedia Software programme.

Integral to the project has been the close participation of Fabula's evaluation partners, educational institutions specialising in the support of bilingual learning and culture in the Basque Country, Catalonia, Friesland, Ireland and Wales. Fabula is funded by the European Commission as part of the Educational Multimedia Taskforce.

Fabula software has been developed using Mozilla Open Source Code (<http://www.mozilla.org>). It consists of two parts. An authoring section that teacher and/or students can use to produce a bilingual story book and a player that can be used to view and listen to the book. This result in software that can be both content rich and content free in its use in schools.

At the first stage of development they used an existing paper storybook and produced a professional quality bilingual piece of multimedia. Then they concentrated on developing the kind of content that a school might typically produce using drawings, a digital camera and a microphone linked to a standard multimedia computer.

The principles and ideals of the project are firmly rooted in the belief that it is vital for multilingualism to be cultivated and in particular for minority and immigrant languages to be nurtured. The software is accompanied by user documentation in all the project's major languages (English, Spanish, Dutch and French) and includes information on how to do the things such as taking digital photos or digitising sound recordings that are outside the scope of the project software provided, together with teaching tips on how to integrate the programme into classroom practice. This teaching advice is being developed in collaboration with teacher partners in the participating countries.

Fabula is being launched in Ireland, Fryslân and Wales in November 2000. As part of the launch they are organizing a bilingual multimedia story-writing competition for schools in Ireland, Fryslân and Wales!¹²

The Catalans and Basques are also having launch events and competitions in the next few months though exact dates have yet to be fixed.

Eurolang

Eurolang is an information service which aims to cover issues related to language diversity within the EU and to the development of the Europe of the regions. The service was launched in February 2000 in Brussels. The objectives of Eurolang are to supply national and regional media with news of general interest about Europe's linguistic diversity. It concentrates on minority and regional language matters and news from European Institutions that affect the minority communities of Europe. Eurolang serves national media across Europe as well as minority and regional language media. It covers day-to-day news as well as supplying longer reports on issues of particular interest to European readers. Eurolang fills what it believes to be a gap in news coverage across Europe by concentrating on issues that affect linguistic and cultural minorities in all EU member states.

The service is Internet based, free of charge and is open to all users. News is supplied by Eurolang own network of correspondents to the Brussels editorial office, where stories are put online. The Brussels office also covers issues concerning the European institutions. Eurolang is run on a non-profit-making basis for the first two years, and is financed as a project of the European Bureau for Lesser Used Languages, with the support of the European Commission. Eurolang is editorially independent.

Aboriginal Digital Collections

Industry Canada's pilot program aims to provide an opportunity for Aboriginal Canadians to preserve, celebrate and communicate their heritage, languages and contemporary life by developing and accessing materials over the Internet. The program will pay Aboriginal youth to create web sites featuring significant Canadian Aboriginal material. The material can range from information on Aboriginal businesses and entrepreneurship to traditional knowledge and contemporary issues, such as the preservation of Aboriginal languages.¹³

Yolngu Languages and Literature CD-ROM¹⁴

The project is a collaboration between a group of Yolngu advisors, the Faculty of Aboriginal and Torres Strait Islander Studies at the Northern Territory University, Sunrise Research Laboratory at Royal Melbourne Institute of Technology and the Open Learning Support Unit of the Northern Territory Department of Education.

For many years literature in Yolngu languages has been used as a basis for students to learn about different Yolngu languages and Yolngu Rom (culture) in bilingual schools throughout Arnhemland. Most of this literature was produced in the Literature Production Centres at Milingimbi, Yirrkala, and Galiwin'ku in the 1970s, 1980s and 1990s. However, many of these books are no longer available in most Yolngu communities. This is because many copies have been used up and original copies lost or damaged.

Michael Christie and Waymamba applied for a grant to make a CD ROM that would store Yolngu literature and make it accessible via computers. By putting Yolngu literature onto CD ROM they hope to preserve it. This literature will then be available for all Yolngu and others who are interested to learn from Yolngu writing, both now and for future generations. Trevor van Weeren from QANTM is coordinating the programming and design.

The CD ROM project aims to:

- Set up a database of Yolngu literature (texts, photos, books, maps, art etc.) in Yolngu languages.
- Work with Yolngu to design computer access interfaces or 'front ends', which help Yolngu store and locate materials according to Yolngu categories.
- Help set up computer systems for Yolngu to control their own information.
- Help Yolngu teachers and language workers to develop the use of computers in education and keeping Yolngu languages strong.

In Australian dollars the CD library cost \$35,000 (not including about six months full time of Michael Christie's work), the dictionary (\$10,000) plus Michael free for 3 months, the Open Learning website and CD (\$100,000)

4.3.2 Public Private Partnership

Dart

One of the main aims of the DART project, partially funded from the European Commission's Directorate of Information Communication's MLIS project, is the setting up of a software localization model with directly applicable to minority languages. In the main, the project involves the translation of an Internet browser into Breton, Irish, Scottish Gaelic and Welsh.

In practical terms, the programme consists of two parts: on the one hand, the immediate localization of a browser into four languages, while on the other hand, providing a multilingual terminology database which is being built up as an integral part of the project. The software will eventually be compiled and tested by Opera. Its release is due in the autumn. Two versions will be made available to users. One will be free of charge and will consist of a certain number of inserts for sponsors. The other will carry no advertising and will be available at a modest price.

The second phase of this project will consist of making the results of the project available to the public, to journalists using these language's, to those working in universities, and to software engineers. They will then be able to benefit from the linguistic achievements of the project in order to speed up distribution of new technologies throughout these different communities.

The structure for this project is three-fold and is made up of minority language organizations, one private partner, and the European Commission. The Universities of Trinity College in Wales, Fiontar/DCU in Ireland, Sabhal Mor Ostaig in Scotland, and the Office de Langue Bretonne in Brittany make up the linguistic side of the partnership. Opera Software, a Norwegian company, is the private partner. Opera Software are the owners of the Opera browser, the only European alternative to the two major American browsers currently competing strongly on the market. The European Commission selected the project within its MLIS programme, which aims to promote linguistic diversity throughout the information society. This programme pays particular attention to lesser-used languages. The European Bureau for Lesser Used Languages came up with the original idea for the project and is now in charge of its overall co-ordination.¹⁵

Cànan

Established in 1992, Cànan Limited is a broad-based Scottish company offering a wide range of communications, marketing and design services with the added capability to work in English or Gaelic. On 13 March the first ever CD-ROM for Gaelic learners was launched. The CD-ROM is a funding collaboration between The Scottish Office Education and Industry Department, Comataidh Craolaidh Gaidhlig, European Commission DGXXII, Canan Ltd, and the Scottish Council for Education and Technology. It is based on the first series of the Speaking our Language TV series which was also funded by CCG. The CD-ROM will be distributed free to every secondary school in Scotland, and is available for sale through Canan Ltd. which is based at Sabhal Mor Ostaig.¹⁶

Mathematics in Canada¹⁷

In Canada a small number of jurisdictions have been involved in direct partnerships with private sector and/or postsecondary institutions to develop software, especially for distance education software, and on-line resources for specific programs of study.

In 1994 the four Western Canadian provinces and Territories formed a partnership with Nelson, Thomson Learning to develop world-class, computer-guided learning mathematics resources. Criteria to be reflected in the final product to be developed included;

- Develop technology-based mathematics resources supported by print materials
- Reflect current curriculum content and methodology
- Support educators in the transition
- Ensure equitable access to math education
- Model of government/business partnership
- Improve student performance in mathematics

This resulted in comprehensive courseware package for each of the Grade 7 to 10 mathematics programs which was matched to the Western Canadian Protocol (WCP) mathematics curriculum. Components included a CD-ROM set, built-in explorer software, built-in glossary, student books for homework, independent study, and practice, teacher's manuals, including explorer worksheets and skill checks, computerized assessment bank, class tracking system, teacher training in-service program

The project demonstrated the need for;

1. Clear curriculum content frameworks (i.e. curriculum and assessment standards/ learning outcomes) on which to build multimedia
2. Multi-year financial commitments by both public and private sector partners
3. Direct involvement of teachers in the design and development of the multimedia

4. Strong project management
5. Well-developed instructional design and pedagogical standards from the beginning
6. Material to engage students through highly interactive computer simulations/activities
7. Commitment and support from school and ministry authorities for implementation
8. In-service training
9. Reasonable purchasing or licensing schemes that are affordable for schools
10. Inter-department collaboration
11. Vision and commitment, probably the most important of all

Encouraging Public Private Partnership in the UK

In the UK the aim of the Curriculum Software Initiative, being run by Becta, is to encourage and increase public private partnership between the education and commercial communities. It has a number of key objectives, which include providing advice and guidance to teachers and the commercial developers. Curriculum seminars have already taken place to investigate which aspects of the curriculum are best supported by ICT, which types of ICT resource have been effective and whether there are specific functions or aspects of software that are important. The project aims to establish a more effective dialogue with commercial developers and will be working in a number of ways to disseminate its findings and to investigate the potential for supporting collaborative approaches to software development. Becta is working with the trade associations such as the British Educational Suppliers Association (BESA) and the Publishers Association to ensure effective links are developed. Findings from research will be disseminated via seminars, the Becta web site and an electronic newsletter for developers. Further investigation will be completed into supporting effective partnerships and liaising with the industry on appropriate methods for establishing consensus and support. A key outcome of the project is to develop dialogue at a variety of levels.¹⁸

An example of a public/private product that is currently available is Real Romans produced by the English Heritage Education Service and TAG Developments.

4.3.3 Public private partnership and the Internet

Brainium (web resource in Canada)

Brainium was developed with advice provided through a steering committee, a focus group and user surveys, with funding assistance from the government in conjunction with Multiactive Education Inc., a division of Multiactive Group of Companies. In three years, Brainium.com has served over 7,000 paying school organizations and 200,000 users worldwide.

Brainium.com has partnered with Ingenuity Works, publishers of All The Right Type and CrossCountry Canada. Schools outside Canada receive Science Brainium plus an additional 15 CD-ROMs from Ingenuity Works when they subscribe to the online resource.

On June 20th 2000, Utah's State Board of Education and Utah's State Textbook Commission endorsed Science Brainium for Utah public elementary and middle schools. The resource will be available to 490,000 students in 747 schools throughout Utah during the 2001 - 2002 school year. Brainium also has partnerships with AT&T Learning Network, Apple Computer, The Lightspan Partnership, Learnware, Industry Canada, N2H2 Inc., nschool.com, The LearningStation.com and Boxer Learning. In the past three years, Brainium.com has served over 7,000 paying school organizations and 200,000 users worldwide. Since September 1999, Brainium.com has also formed partnerships with the AT&T Learning Network; Apple

Computer; Learnware, Industry Canada; The LearningStation.com; and Boxer Learning. Through Industry Canada's SchoolNet initiative, Brainium is available to teachers and students at English language or bilingual schools within Canada. The British Columbia Ministry of Education has pre-purchased licenses for its provincial schools. On June 27th, 2000, NTS Computer Systems Ltd. a technology-based education company, bought Brainium for \$11.8 million

Trend in Sweden¹⁹

The trend in Swedish software/digital content development has been in the direction of online content rather than CD based material. It is believed that the market for CD material, particularly the school market, is too small and the competition from edutainment and entertainment software is too strong. Paregos (www.Paregos.se), one of the leading companies in this field, illustrates this trend. The company this year produced interactive educational web sites for both the Swedish Parliament and Swedish Total Defence

In Sweden, a public-private foundation called the Foundation for Knowledge and Competence Development - "the KK Foundation" - has launched a project called The Database for Educational Material (<http://knut.kks.se/laromedel/>). At the moment the database contains reviews of more than 450 products from 86 different publishers. It contains both commercial CD-ROM products and free Internet based products. In the database you can find a description of the product by the publisher and reviews from teachers and students.

The KK-foundation has given financial support to web sites on the basis of the following criteria: quality regarding pedagogy, design and technology, as well as involvement in questions on equality between both sexes. The web sites are required to be suitable for both boys and girls.

The website developed cover a wide range of subject areas including science, technology, ethics and history (See Appendix 1 for more deatails)

In the UK, there are a number of companies starting to provide free educational material such as Cadburys (<http://www.cadburylearningzone.co.uk/>) and Sainsbury (<http://www.jsainsbury.co.uk/museum.htm>).

4.3.4 Competitions

Canada²⁰

In Canada there is a growing trend to produce software in response to specific Requests for Proposals. These set out priorities for development to meet local needs, and developers submit software titles and evaluation copies for review. Proposals are reviewed for pedagogical content and technological aspects of each title, as the basis for negotiation of province-wide licenses. This approach ensures that software is developed in concert with curriculum priorities. Dialogue between experienced teachers and developers is encouraged at the commencement of the development process. Discussions between the two parties will help ensure that the software that is developed ultimately meets expressed local needs. Such collaboration often involves partnerships between the ministry/department, the school board,

and private sector companies. Greater use is being made of focus groups as a strategy to reflect client needs and quality criteria/assurance.

Portugal²¹

Since 1989 the Ministry of Education in Portugal has promoted, annually, National Competitions for Educational Software. These competitions started with Minerva Project (the NIT project for schools launched in the mid eighties) and played an important role in promoting the constitution of software development teams. In spite of the difficulties and delays in the publication of the titles awarded, these competitions contributed to the creation of a quality educational software market.

Since the 6th Competition, in 1995, the publishing policy of the Ministry has evolved in two ways:

1. copyright remaining with the authors so that they may negotiate with the publishers and
2. Three hundred and fifty copies of the winning software are bought centrally and distributed to the education centres. These titles are also strongly recommended to schools.

The titles available online, as freeware, consist of the software awarded as well as some projects the Ministry has supported, namely:

- European Pool of Educational Software
- Partnership with the Working Group of the Ministry for the Portuguese Discoveries, resulting a CD-ROM on “History and Geography of Portugal”
- Software offered by Portugal Telecom in the area of special needs.

Some of this software is now outdated, from a technological point of view, however maintains pedagogical interest.

The Nónio-Século XXI program continued this policy of using national competitions to stimulate the production of educational digital content. Between 1997 and 1999 it resulted in 14 educational CD-ROM's and 30 web based resources. Funding of €60,000 was made available to fund the development of web based resources. A sample of some Maths resources developed in this way is available at <http://www.dapp.min-edu.pt/nonio/softeduc/soft3.htm>

4.3.5 Other Examples Of Developments From Outside Ireland

Elhuyar²²

Elhuyar, a commercial minority language software development company, develops quality software for working in and with the Basque language, Euskara. They are involved in the normalisation of Basque in the workplace, the publishing of scientific and technological material in Euskara and for the drawing up of didactic, IT and lexicographic material in the language.

Elhuyar came about from an initiative by a group of former students of the University College of Engineering in San Sebastian the aim of whom was to have Basque as the language of normal, everyday use in the scientific world. With the initial objective of dealing in Basque with subjects and themes encountered in engineering, they began to work on related

mathematical questions and those of physics and chemistry. The desired end-result was the normalisation of Euskara in the fields of science and technology, a project that was to require the development of suitable terminology.

In 1994 Elhuyar brought out the first cd-rom in Basque, Ezagutu Gipuzkoa (Get to know Guipúzcoa). Since then, they have continued publishing cd-roms aimed at end-users of a wide variety of ages and interests

They have also developed a Basque-Spanish/Spanish-Basque Dictionary, which contains 87,000 entries and over 100,000 subentries. As it is published on the web it is relatively easy to update and expand it. They are aiming to double the content in the short term. It is available at www.euskadi.net/hiztegia. They are also developing support tools for Basque language operating systems like the Basque version of Windows 98.

SCRAN²³

SCRAN's is an initiative to create a fully searchable resource base of Scottish material culture and human history. Funded by the Millennium Commission, they work with project partners such as museums, galleries, archives and universities to digitize selected parts of their collections. There are over 200 projects underway and material is being added to the resource base daily.

By the year 2001, SCRAN will provide easy access to one million text records of historic monuments and of artefacts held in museums, galleries and archives, plus 120,000 related multimedia resources. In addition, SCRAN will have commissioned 100 multimedia essays, based on these resources, for educational use.

SCRAN will cost just under £15 million, of which 50% has been secured from the Millennium Commission. Matching partnership funding was provided as a combination of cash, in-kind resources and, critically, copyright licences permitting SCRAN to use for educational purposes the assets of the participating museums, galleries and archives.

SCRAN will take until the end of August 2001 to complete its contract with the Millennium Commission, after which it will continue as a self-financing organisation, commissioning and giving access to multimedia resources. The contract with the Commission was finalised in September 1996.

SCRAN was founded by a partnership of the National Museums of Scotland (NMS), the Scottish Museums Council (SMC) and the Royal Commission on the Ancient & Historical Monuments of Scotland (RCAHMS). Also on the SCRAN Board are representatives of the British Computer Society (BCS), the Conference of Scottish Higher Education Principals (COSHEP) and the Scottish Consultative Council for the Curriculum (SCCC), under the Chairmanship of Lady Balfour of Burleigh.

Other national and local institutions throughout Scotland are working in partnership with SCRAN, upgrading selected parts of their collections records and resources for addition to the SCRAN resource base. SCRAN is providing grants of up to 50% of the cost of these projects.

Digitized assets contributed to SCRAN are governed by a licence agreement protecting the contributors' commercialisation rights while ensuring unrestricted access, free at the point of use, for members of participating educational institutions. Explanatory text and thumbnail images are freely available for home learning, while SCRAN licensed members such as schools, libraries and community centres can download more extensive assets, copyright cleared for educational use, and protected by invisible watermarking and fingerprinting.

A range of multimedia essays are being produced by SCRAN in partnership with the relevant institutions, users and multimedia production companies. CD-ROMs have been generated directly from the SCRAN resource base by SCRAN staff

SCRAN is available at a wide range of community information points, including schools, libraries, museums, community centres and tourist information centres, as well as in the home.

SCRAN is accessible via the Internet and its resources are also available on CD-ROM. Schools that subscribe to the SCRAN web resource get an automatic site licence for each CD they purchase.

The projects developed in partnership with SCRAN cover areas including history of Gaelic Scotland, Scottish writing, poetry and songs. (See appendix 1 for more details)

SCET²⁴

SCET (Scottish Council for Educational Technology) is committed to providing state-of-the-art educational resources to schools, further education establishments and the business community. They also provide advice, guidance, training, technological solutions and consultancy.

SCET's mission is 'to transform learning throughout life by unleashing the power of technology'. SCET's team consists of both technical and education experts, who provide a blend of expertise in a range of areas, including multimedia development and curriculum software.

Some of the services SCET offers are:

- A user-friendly technology centre
- A wide range of training programmes and events
- Production of tailor-made CD-ROMs and videos
- Development and hosting of web sites
- The management of licensing schemes for Scottish education.

SCET are currently working on localizing their "Let's go with Katy" series into Scots Gaelic. Some of the needs they have identified when localizing software include;

- It is best to write the software with translation in mind, i.e. put all text in a separate file that can be easily extracted for translation. Alternatively flag the software so that text can be easily identified in the code
- Often other languages are longer than English, which can cause problems with, screen layout - the font can be altered but you need to start off with a large font size.
- Voice recordings need to be well organised and you'll need the help of a native speaker to ensure that intonations etc. are correct.
- Graphics with text might need to be altered, so keep originals so that you can change them.
- Some testing needs to be done by native speakers to ensure that everything is correct.

They have developed a wide range of educational software. One series of CD ROMs they produced, called the SCETNet series, were designed as an introduction to using Internet resources. Much of the content was taken from existing Scottish websites, around which activities were organized for media studies, modern languages, chemistry, English and communication, art and design, business studies etc.

They have expressed an interest in pursuing partnerships for developing software for the Irish Education System

Scottish CCC and SCET merged to form Learning & Teaching Scotland on 1st July 2000.

4.4 Lessons to be learned from experience outside of Ireland

There are a number of features of developments that have taken place in other countries which we in Ireland should consider before taking action here. These include;

- Need to publicise and disseminate information and results of research as well as the software developed (Fabula, Dart)
- Need for partnership between educationalists and software developers (UK, SCET, SCRAN, Canada, Fabula, Canan)
- The need for language expertise where localizations are involved (SCET, Fabula)
- The value in cross language cooperation to achieve a common goal (Fabula, Dart)
- The value of funding of indigenous people to develop and digitize, and thereby help to preserve, aspects of minority language and culture (Aboriginal Digital Collections, Yolngu Languages and Literature CD-ROM)
- The need to involve indigenous people in the development of minority language software rather than having it imposed by an outside group. (Yolngu Languages and Literature CD-ROM)
- The need to create awareness of minority language issues (Eurolang).
- The need to develop localized support resources/in-service training showing teachers how software can/should be used in the classroom. (Fabula, Yolngu Languages and Literature CD-ROM, Canada)
- The need for asset holders (national or minority group) to digitize their assets that they may be used for producing digital education content. (SCRAN, Yolngu Languages and Literature CD-ROM)
- The need to facilitate and encourage multinational developers to localize their products for use with minority languages (Dart)
- Web resources can be easier to distribute and update. (Eurolang, Brainium, Elhuyar, SCRAN)
- National agencies have a role to play in encouraging Public Private Partnership for the production of educational software/digital content (UK, Canada)
- Projects require multiyear financial commitment (Canada, Fabula, SCRAN, Eurolang)
- Projects/product developments originally in receipt of state funding can become financially self supporting and self sustaining (Brainium, SCRAN)
- Need for reasonable purchasing or licensing schemes that are affordable for schools. (Canada, SCRAN)

Section C

Issues And Recommendations

5. Issues Emerging

5.1 Growing Demand

There is a growing recognition of the need and a demand from teachers in Ireland for software/digital content suitable to the curriculum. While teachers have made use of existing software developed abroad for the English and American markets its suitability for use in Irish schools is questionable. Most of this software was designed for the home market and falls into the category of edutainment. The lack of software directed at the Irish curriculum has encouraged some teachers with high IT skills to use content free software and discouraged teachers with low IT skills from trying to integrate ICTs into their teaching and their students learning.

5.2 The Market

The market for educational software in Ireland is small. The market for Irish language software is smaller still. Private companies will not meet all the needs of the Irish Education System.

They may be able to develop commercially successful products in some areas where they can tap into markets outside of the school but this may take away from their suitability as a teaching tool in the classroom. For example software targeted as revision material for the Leaving Certificate will sell well in the home market but be less suitable in a classroom context.

In the area of Irish language software they may be able to produce commercially successful software for teaching/learning the language itself where the market is all schools in Ireland as well as Irish interest groups outside of Ireland. They are unlikely to be able to produce software on a commercial basis for education through the medium of Irish.

If the Irish education market is divided strictly by language of instruction then software developers will develop software for the English speaking Irish market but professionally produced Irish language software will be rare.

Irish language software is more likely to be developed on the basis of a bilingual approach to the Irish education market where there is state funding available.

If Irish software developers can develop products that are suitable for the UK and American market then they may become more financially secure. Unfortunately to develop a culturally generic product of this nature one has to strip away aspects of cultural identity that may be seen as being desirable for educational software for the education system in Ireland.

Software developers that intend to service more than one language group should build in flexibility for localization at the design stage of development and not wait until they have a finished product in one language.

5.3 High Cost of Software Development

The cost of developing educational multimedia has not changed significantly in the last five years. Inflationary effects have been balanced by the decrease in relative costs in software development tools and the hardware to run these tools on, along with the huge increase in the functionality of these tools.

The European commission report from the Task Force on Educational Multimedia estimated the average cost for the development of CD-ROM based software as being between 100,000 and 300,000 ECU per title. This was based on software making full use of interactive multimedia (video, animation, sound, text, graphics).

It is possible however to produce or localize software for less than this if less media are used. Video in particular is seen as being relatively expensive. It is possible to create good quality, focused educational software for under £25,000.

It will be more cost effective to localize an existing product, where appropriate, than to develop it from scratch.

5.4 Need for Government Intervention

All agencies, companies and individuals with whom I have had contact agree that educational software development can be facilitated by government intervention and that minority language software development will not happen in a significant and sustainable way without it.

What level of intervention there should be and how it would operate however is a different matter. I found no country with a well-organized systematic policy in the area of minority language educational software/digital content development.

5.5 School Budgets

Schools have tended to buy hardware rather than software. This is a common trend in a developing market. To encourage schools to buy software, funding needs to be provided under conditions that it may only be spent on software.

5.6 Internet Access In Schools

Development of content for web rather than for CD distribution can be a more effective delivery medium. IT 2000 in partnership with Eircom, made a significant contribution in raising the level of Internet access for schools by providing a free telephone line, ISP account and subsidised phone bills. In many schools however there is only one computer linked to the Internet. For the Internet to make a more significant impact on education there needs to be a much higher level of access at a lower cost. Schools need Internet access at the level of

broadband whole school network access rather than one machine in one room. To enable this schools will need a higher level of technical support and/or training to keep the connection working properly as well as initial funding to set it up.

5.7 Teacher Training

Another factor inhibiting the educational software market in Ireland is the skill level of Irish teachers. This is a situation that has been improved by the actions taken in IT 2000. Put simply, teachers will not buy software that they cannot use. There is a need to increase the training available to teachers so that they are more likely to take advantage of the opportunities that computers offer to education, and in turn more likely to be willing to invest in software.

Software developers have a role here as well. A growing trend among educational software developers in America is that on top of developing software they also develop resources to show the teacher how to use their software in the classroom to meet specific curriculum requirements, along with assessment and record keeping tools to track student progress. Riverdeep, an Irish company in the American market would be an example of this.

5.8 The Role of Third level Colleges

There is a role for some third level courses in the development of software/digital content for education. For example a computer science department teaching the programming of Java applets could cooperate with an education department to produce applets that are educational by design and that could then be made available through Scoilnet for use by primary or secondary students. Such a partnership could also serve educational research. Similarly Irish language departments may be able to offer expertise as part of a partnership producing Irish language software/digital content. Similarly teacher training colleges for the primary sector may also have a role.

Third Level Colleges also have a role and a responsibility to ensure that the teachers they train are computer literate and have an appreciation of their own role in the integration of IT into the curriculum.

Third level colleges have a role in offering postgraduate courses that education experts could take that would better enable them to get involved in software development and work in partnership with software developers.

5.9 Evaluation

There is a need for a central database of information in the area of software evaluation. This would serve teachers, students and parents in giving them good information on what software is available and how suitable it would be for their situation.

It would also serve the software industry to have objective information available on which customers could base decisions. It would assist them in spreading information about their products to schools.

5.10 Content Database

A very wide variety of Irish institutions have resources that could be made available to the education system as a whole and to software developers in particular. The National Museum, the National Library and the National Art Gallery are obvious examples but there are a great number of small collections that are not made available to the public, as the institutions that own and preserve them do not have the resources to do so. An online database of multimedia resources would be of considerable value to all partners in education. The Scottish development of SCRAN would serve as a suitable model. Resources from the database could be made available to schools and educational software developers in Ireland royalty free, or at reduced rate, provided their use was for educational purposes.

If software developers could access many if not all the multimedia resources they need to develop say a piece of history software from such a database it would considerably simplify and cut down on the development cost and time needed to bring the product to market.

5.11 One Bilingual Policy Rather Than Two Monolingual Policies

The aim of encouraging Irish language software development would be better served as part of a policy to develop bilingual educational software for the Irish market than by having a completely separate policy from software created in English for the Irish education market.

For example, if a software developer is producing a piece of software/digital content for teaching science to Junior Certificate level, it would be much more cost-effective (and therefore more likely to happen) to encourage and facilitate him/her to develop an Irish language version at the same time, than to have another company develop a similar piece of Irish language software from the ground up. Both the Irish and English language versions could be made available on the same CD/website which would have the effect of simplifying distribution systems (one system instead of two) and also makes the Irish language version available to schools who would not otherwise buy it.

5.12 Specific Tools

There are specific tools that are needed by the wider Irish language community that would be useful for the education sector. Examples of these include a good dictionary and spell checking and grammar checking software for word processing. Those with whom I had contact did not see the use of English language environments like Macromedia Authorware or the Windows 98 desktop as an issue. The Irish language community is a bilingual one. There was interest in the Irish language browser being developed on the Opera platform but concern that such a development may be a once off development that might not carry over into the next version.

6. Recommendations

6.1 Policy On Software Development

Policy for stimulating minority language software/digital content should be part of a comprehensive policy for stimulating education software development in general.

6.2 Competitions

Where there is an identified gap in the market that commercial developers alone cannot fill, the NCTE would publish tenders for content/software. Developers could compete for the contract in the normal way. The NCTE would then guarantee to buy 300-500 copies of the software for distribution to Education Centres providing the software met the contracted specifications. Creating a guaranteed market in this way would remove some of the risk factor for developers and also enable NCTE to help set high standards of pedagogy in Irish educational software. All software developed in this model would be bilingual with both versions distributed on the same CD/web site where possible. The models used by Canada and Portugal should be more closely examined

6.3 National Licence Agreements

Other countries, eg Canada²⁵, have had positive results from negotiating with software companies at national level rather than on a school-by-school basis. The NCTE should play a similar role in Ireland

6.4 Central Purchasing

Due to the small size and geographically widespread nature of the Irish speaking schools it is cumbersome and not cost effective for developers to deal with schools on a school-by-school basis. If Irish Language software for Irish language schools could be bought centrally and distributed by a single agency it would offer benefits to all involved. Schools through the purchasing agency could negotiate a better price for a bulk order and developers would have a much more concentrated market lowering their costs. Schools collectively would indicate what software they want to buy and the purchasing agency would negotiate the terms. Purchasing decisions would remain at local level, as they are now, but developers would deal with a large number of schools through a single agency.

NCTE to coordinate central purchasing and to negotiate on behalf of schools.

6.5 School Budgets

Schools should be given budgets specifically for software. A system should be put in place to ensure that the money was spent appropriately and not used for other purposes. While these budgets should be based on the number of students enrolled special consideration should be given to small rural primary schools, as many Gaelteacht primary schools fall into this category.

For the time being, clear direction and advice should be available from the NCTE on how schools should best spend this money. Many teachers do not currently have sufficient experience in buying and using software to make informed decisions.

6.6 Increased Internet Access For Schools

The implementation of broadband, whole school network, internet access in as cost effective manner as possible for all schools as soon as possible. In the short term an increase of the subsidy for school internet access from one to two hours a day.

6.7 Teacher Training

Increased training for teachers, particularly in using content free software where they and/or their students can author their own materials, focusing on aspects of the curriculum. While the authoring tools may be in English the content can be in Irish or other languages. Software developers should be involved in delivering courses for teachers to help foster an understanding of how software can be used to meet the needs of the curriculum.

NCTE to coordinate ongoing training through the Education Centres.

6.8 The Establishment Of An Online Asset Database

An online asset database would a resource for students, teachers, and software developers. Special consideration should be given to the development of a bilingual approach wherever possible. Partnership funding to be provided as a combination of cash, in-kind resources and, critically, copyright licences permitting use for educational purposes the assets of the participating museums, galleries and archives. Long term this could be self-financing by charging for access and for commercial developments using the assets of the database.

The NCTE should examine more closely the model provided by SCRAN in Scotland and coordinate, in conjunction with the Library Council and other national institutions, the development of a similar resource in Ireland.

6.9 Bilingual software

Facilitate developers to develop Irish Language versions of their products in parallel with the English language version that can be distributed on the same CD/web site. A procedure for doing this would need to be established where the software developer has easy access to Irish language expertise.

One means of funding this may be through central purchasing by the NCTE of 300-500 copies of the software for distribution to Education Centres provided the software meets agreed standards.

NCTE to foster a close relationship with software developers so that they can be aware when an opportunity for such intervention exists and to foster relationships with Irish language experts who can liaise with developers at appropriate stages of software development.

6.10 Specific Tools

NCTE in conjunction with Irish language experts (Foras na Gaeilge, ITE, Fiontar, Everson Gunn) to commission the production of specific tools for the Irish language community. In particular a spelling and grammar checker, and a dictionary. The specifications should be put out to tender and the NCTE will guarantee to buy a state licence for all Irish schools from the winning company, provided the software meets the contracted specifications. Individuals or organisations can buy the software in the normal way.

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Appendix

Examples of Swedish Websites

Vattenkikaren (the water telescope) <http://www.vattenkikaren.gu.se/>

The water telescope can be used for all northern marine environments, in Europe and in the USA East coast down to Virginia. This site has already gained both international attention and a prize. Students can get a great deal of information working with the site, e.g. she/he can examine a shallow bay and communicate with scientists. The pictures are very illustrative.

Naturvetenskap teknik och etik (Science, technology and ethics)

<http://www.knut.kks.se/not/not99>

This site ties together 10 projects in science, technology and ethics. Questions on ethics, for example, can cover several subjects. One theme is water. You live on an island with a number of different environments including cities, rivers, beaches and farms. To develop this island you have to solve several ethical and technical problems with interactive exercises.

Genvägar (Genetics and ethics) <http://www.genvagar.slu.se/>

This is a web site about genes and ethics with excellent pictures. It seeks to explore the possibilities, risks, ethics, technology as well as looking at evolution etc. It contains amusing exercises in how to create a dinosaur or how to make a copy of Madonna.

Ostindiska Kompaniet - Swedish China Trade during the 18th and 19th centuries

<http://ostindiska.educ.goteborg.se>

This site was produced in conjunction with the ICT educational centre in Gothenburg. It contains an imaginary trip to China, various studies of authentic sources, excellent illustrations. The project involves almost all disciplines: history, natural sciences, social science, economics, technology and geography. There are many exercises in both practical and theoretical fields.

Totalförsvaret - Total Defence <http://www.totalforsvaret.se>

This site is designed for second level students, using Macromedia Flash and popular comics, as well as four games. Along with information on Swedish Defence, this site focuses on international issues such as the role of the UN today, world conflicts after the end of the Cold War etc.

Examples of projects developed in partnership with SCRAN

Gaidheil Alba (Multimedia Essay, Pilot)

This project will produce a CD-ROM relating the history of Gaelic Scotland, with immediate relevance for the teaching of history in Gaelic-medium schools and colleges, and, in translation, in English-medium education in Scotland and beyond. The programme will be based on the wealth of items in the National Museums of Scotland and in the School of Scottish Studies, including photographs, text, oral testimony and video clips.

The Sound of Scottish Writers

This project digitizes a selection of a unique archive of modern Scottish writers, some now deceased, reading their own work. The basis of the project is 200 poems in Scots, English and Gaelic by writers such as Sheena Blackhall, Flora Garry, Sorley Maclean, William Neill, Tom Scott and others.

Cave of Gold (Uamh an Oir) Multimedia Essay

This project consists of a Multimedia Essay plus full descriptive records about traditional Gaelic poetry and song. Focusing especially on the poets Sorley MacLean and Ian Crichton Smith, the fully interactive Multimedia Essay allows users to hear and see the text of Gaelic poetry and song. Each excerpt is illustrated by clips taken from a recent television documentary, giving a narrative interpretation of the Gaelic text.

Scottish Authors

Video and audio sequences of authors discussing and reading their work and still images of authors - at different ages, with subtitled video sequences for Gaelic poetry or prose. A descriptive record will accompany these, including complete biographical details of the author, and contemporary reviews of the work in question where appropriate.

Treasures: University of Glasgow Library

Illustrative material ranging from mediaeval manuscripts, early printed books of the late Middle Ages and the Renaissance, to superbly hand-coloured engravings. The majority of this material will come from the celebrated 18th century library formed by Dr William Hunter of East Kilbride.