

ORMEE - Observatory on Rights Management for e-Learning in Europe  
A project financed in the framework of the European Commission e-Learning initiative  
Agreement N° 2003-4727/001-001 EDU ELEARN

## **ORMEE**

### **Observatory on Rights Management for e-Learning in Europe**

**Agreement N° 2003-4727/001-001 EDU ELEARN**

***WORK PACKAGE No. 2***

**DRM solutions  
addressed to e-Learning environment**



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BolognaFiere, Italy**

**FEP - Federation of European Publishers, Belgium**

**Research Center for Network Technologies and Multimedia Applications Technical  
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## Summary

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## 1. Presentation of the study

The objective of this study is to provide an overview of the current state-of-the-art related to the adoption of DRM (Digital Rights Management) technology by content providers for the delivery of digital content in the European educational network.

Over the past few years, the world of textbook and educational material publishing has been marked by the process of innovation and integration resulting from the advent of digital technologies that are completely changing the culture industry.

The spread of these technologies has raised the need for a greater involvement of teachers and students alike in the transformation processes at work in the world of knowledge and information in order to develop in anyone the ability to use autonomously and rationally the potential offered both immediately for teaching and learning and for the rest of their lives in the context of ongoing education and training.

In this context, it has been acknowledged at the level of both the European Union and individual Member States the need to promote the integration of these new technologies in traditional teaching both by providing schools, teachers and students with technological infrastructure, networks and hardware and promoting specific training courses for teachers, in such way creating the ideal conditions in order to develop new teaching and learning models that envisage the regular and integrated use of new digital educational content alongside traditional textbooks.

As a result of the changes underway, a new digital educational content market is emerging with a new commercial approach (as has already happened in other areas of publishing, such as legal databases and university publishing): from the distribution and sale of tangible products to the distribution and licensing of intangible products, from the products to the services.

In this new context, the textbook publishers that have always based their activities on the production of textbooks and maintained their undisputed leadership of the educational content market must now seriously reconsider their roles and find a way to deal with their new competitors, which include companies specialised in e-Learning or others coming from the world of technologies uninterested so far in the production of educational material, that is companies with great skills in managing technological innovation or with impressive abilities in the creation and production of digital content and now consider the world of educational publishing as a lucrative new form of business.

Publishing production is primarily oriented towards two different directions:

- The creation and delivery of so-called LOs (Learning Object), or rather single units of educational content in digital format (such as greater detail on specific topics, exercises, tests, etc.);
- The development of complex forms of e-Learning in its widest sense, i.e. complete training courses delivered on-line with the use of the appropriate integrated platforms.

[For greater details on this subject, see Chapter 1 of the study T2.4 carried out within the framework of the same Ormee Project].

This commercial change could not but have a strong impact also on the management of the rights linked to such content (copyright and licensing, etc.). If, in fact, the rules governing the copyright applied to paper or "hard copy" are by now consolidated, the management of digital rights, or the digital management of copyright, is a recent matter and has not yet acquired a universally recognised standard, despite the efforts made by the EU – DG Information Society – with its Directive on Copyright 2001/29/EC and the "Directive on Harmonisation of Copyright and Related Rights in the Information Society". As regards the educational field instead - as documented in the study carried out by the Federation of European Publishers in the context of the Ormee Project (T2.1) to be consulted for greater detail – each Member State has made different use of the possibility implied in the Directive to establish exceptions regarding the introduction of the Directive in its own national legislation. At the same time, the European Union - always as regards the Directive 2001/29/EC - has identified the study of DRM systems, capable of defending intellectual property rights, as an additional priority in order to develop the information society and for the global digital content market even in the digital era.

*"Digital technologies have transformed the copyright environment and have given rise to a potentially huge market for content. The advent of broadband networks and their capacity to transmit large volumes of multimedia content at high speeds emphasises the importance of ensuring that digital content is available under the appropriate conditions, which meet the interests of both right holders and users.*

*The Directive supports the use of DRMs by protecting technical measures, and by requiring Member States to take into account the application and non-application of technological measures when providing for fair compensation in the context of the private use exception for which fair compensation is required."* (Source: <http://europa.eu.int>)

Copyright management becomes essential in this scenario as regards the development - in economic terms as well – of an educational content market that can only be conceived

in a transnational form, given the enormous potential offered by digital technologies, and in particular, in the primary vehicle for digital content: Internet.

In light of these factors, DRM becomes a topic of discussion – and a need that cannot be delayed - for the entire educational sector. The starting point for this study cannot therefore be other than an analysis of the various meanings of the term DRM, giving special attention to both the level of evolution and development that underlines any specific definition of DRM, and the relevance and applicability it might have in the context of our study, i.e. the world of education.

The continuously developing technological, economic, legal and social implications, which make the implementation and regulation of DRM rather complex, shall also take into consideration the various aspects and the vested interests involved in the educational sector.

In fact, it has already been mentioned how the application of DRM solutions is relevant to the creation of a single market of digital educational material. This market shall guarantee a minimum level of standardisation and interoperability from the technological viewpoint - and precisely for this reason the standards of description of the content compared to the existing technological solutions for the distribution/delivery of content and the DRM systems available in the market acquire increasingly greater importance.

In this market the players shall make strategic choices as regards the licensing model adopted by assessing the sustainability and consistency with the reference target and also harmonise said choices with the national and European standards and regulations in force. All these assessments shall contribute to the drafting of a business model (or more than one business model) most suited to the needs of the educational world but equally economically sustainable for the operators involved, whether they be content providers, aggregators, or distributing intermediaries.

## 2. DRM: a definition

It is hard to define DRM in one way alone because the acronym DRM (Digital Rights Management) has a different meaning according to its development level; a good definition is provided in La Macchia (2002)<sup>1</sup>:

*“the ultimate goal of a distributed DRM system is for content authors to be able to project policies governing their content into remote environments with confidence that those policies will be respected by the remote nodes”*

Mainly DRM is intended into two different ways:

- under the first and most widespread definition the term DRM identifies the “management of digital rights” by means of content encryption and the distribution under payment of the access keys, in order to prevent illegal access to the contents.
- under a newer definition that has been also adopted by the W3C\* as official, the term DRM identifies the “digital management of rights”, thus assuring not only security against illegal access or duplication of contents, but also involving description, identification, delivery, protection, control and tracking of every usage right for a licensed specific content.

A DRM system typically allows to:

- define a set of rules (business model) according to which the system is able to allowed the access to contents only to authorized users;
- manage the distributive intermediation if there are third parties involved in the process between the rights holder and the end user;
- account accesses to contents and the relative remuneration to all parties involved in the distributing chain;
- codify contents at the origin and to decode them for the end usage, according to the validity of the digital licence acquired by the end user and as allowed;

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<sup>1</sup> LaMacchia, B, 2002, Key Challenges in DRM: An Industry Perspective, ACM Workshop on Digital Rights Management, Washington

- control digital licence distribution only to those who have paid to acquire a proper licence to access contents.

The fact that this definition is not entirely clear makes the applicability of DRM difficult: in some cases, the hardware technology issue prevails, in other cases the software aspect is more relevant, in other cases, more importance is attached to protection of content and access control, while neglecting other questions that might be more urgent depending on the framework and the context of application. The next chapter which shall focus on the digital educational content value chain shall underline how in our case the definition of DRM tends to enlarge and embrace all the possible above-mentioned meanings and how it become a key element in the definition of the business model for this new sector.

### 3. DRM and the value chain

It has already been pointed out that the transition from a market dealing with "physical" contents to a market dealing with digital contents implies a transformation of the market itself with the entry of new stakeholders alongside the traditional protagonists, in this way also changing the role of the traditional stakeholders.

This transition also has a strong impact on the management of the rights (copyrights, licensing rights, etc.) associated with such content. In order to better understand these changes, the role played by DRM in the "regulation" of this scenario and the specific position occupied by each subject within the redefined chain of value - with particular attention to the role played by educational material publishers - a model of the value chain will be analysed in the following pages by outlining the "pathway" that digital educational content follows within the chain itself. Before proceeding further, however, it is necessary to precisely identify the main stakeholders and to underline how their roles and their interests may overlap. Moreover, it is important to provide an initial general explanation of the terms used in this study:



## **3.1 Protagonists**

### **3.1.1 Content Providers**

Content Providers are the parties directly involved in the planning and creation of digital content and the distribution and/or delivery of the same. Limiting the analysis to educational content, content providers might be roughly likened to textbook publishers. In any case however, as mentioned above, textbook publishers are no longer the only ones who perform this delicate task because there are other players who consider the digital content market as a ripe occasion to develop and diversify their business. These players range from telecommunications companies (TLC) - that already have consolidated and innovative technological infrastructures often already applied to the ongoing corporate and professional education - to software producers. These protagonists often work in partnership with other parties and institutions (universities, research centers, and even publishers themselves) capable of providing specific know-how in the field of content and teaching materials.

It is possible to figure out which are the scenarios opening up for these players as regards the management of the rights involved with this transition from paper to digital materials.

Similarly to what happens in the production of hard copy materials, Content Providers invest capital and resources in devising and creating educational content in digital format. Following conception, these materials shall be provided to final users in order to obtain a return on the investment made. Consequently, these providers shall also protect themselves against the (illegal) copying of their content. Moreover, due to the specific nature of content in digital format, they shall also protect themselves against the risk of their content being transferred, modified, or illegally accessed - a risk that does not occur when the content is in a traditional support material such as a book in paper form.

### **3.1.2 Aggregators**

Another important element of the chain is represented by the Aggregators, or in other words, the parties involved primarily in the delivery/distribution to the final users - usually through a web gateway - of the digital content that they have received from third parties, such as textbook publishers operating also in digital format or other content producers such as newspapers and television channels, etc.

The Aggregator enters into agreements with content providers that establish the fees, the rules of usage and pricing policy.

Aggregators are often remunerated with a fee calculated on the basis of the volume of content provided by the content provider and effectively sold.

One of the main characteristics of the services provided by the aggregators is the use of metadata standards that facilitates research and selection for the final users by allowing the homogenous classification of content.

### **3.1.3 Final users**

Further downstream in the process stand the purchasers/final users who expect possibly transparent or at least easy to use solutions with clear and precise rules from DRM systems that make purchase quicker and secure, such as using pre-paid cards or systems making micro-payments possible, and that after acquiring the rights to the use of any given content allow them to use it on the various devices owned.

In the education sector, the purchasers and the final users of digital educational contents are often two different parties, and in many nations, in fact, these contents are acquired directly by schools or teachers using funds provided by the Ministry of Education expressly for the purpose. Once the school has acquired these contents, they are placed at the disposal of the teachers and students during school hours.

This entails a more complex management of the problems linked to the management of the rights involved. In fact, the DRM system shall manage both all the interlocutors involved and the authorisations for the same in order to properly use the content acquired by the school.

## ***3.2 Phases in the chain of value***

The analysis of the process of production, distribution and usage of digital contents implies the identification of some phases of particular importance in order to properly manage the DRM:

- Planning and creation of content
- Definition of identification standards
- Choice of protection systems
- Selection of technologies used for storage
- Definition of delivery methods
- Definition of access/licensing methods
- Definition of pricing policy

### **3.2.1 The creation of content**

The first phase envisages the planning and the creation of educational content by the authors, who can propose their ideas to the content providers or work on the basis of a specific assignment given by the content providers. The rights to the contents provided in both cases are acquired by the Publishers/content providers according to the contract model traditionally used for copyright protection.

This first phase of content creation (simply put the writing of the content) is followed by a second “productive” phase in which the educational digital content is produced exactly as required on the basis of the proposals provided by the authors. In addition to copyrights, this phase includes the purchase of iconography/graphic and multi-media materials according to different procedures. In this case as well, specific contracts are usually entered into with the producers of the various material.

### **3.2.2 Content identification**

Once "produced", content shall then be identified in order to be suitable for classification which facilitates the research and retrieval by final users.

Content identification is all the more necessary to the extent that the DRM and delivery technology system is sophisticated. Identifying contents, in fact, means not only associating the relevant additional information (the so-called metadata) that describes the content, but also outlining the rules of usage and the technological information regarding the standards that allow interoperability, i.e. the possibility to be compatible with different systems of management and delivery. The topic of standards is of primary importance also as regards the choice of the business model by the publisher/content provider. It is important to note that the adoption of a standard of interoperability would allow the same party (such as a publisher of educational materials) to distribute its contents over multiple distribution channels, such as its own website, or the gateway to one or more aggregators, etc.

This is the phase in which the decisions of technological nature regarding the description of the learning objects (LO), rights, access, and privacy are taken:

- DRM metadata;
- LO metadata;
- DRM description language;
- Access control and tracking algorithms;
- The language related to the interoperability of the content and the device at both the DRM level (such as MPEG21 - REL) and at the LO level (such as SCORM).

### 3.2.3 Protection

In addition to using DRM systems for the management of the rights involved in specific digital content, content providers are also testing and monitoring the possibility that technology is now offering relating to the physical production of contents protected by copyright. In particular, these systems can have various complementary objectives, for instance, the use of special systems to prevent the execution of some specific functions such as access, printing or copying, or to identify the origin of digital objects through appropriate digital marking systems like watermarking and fingerprinting.

	Encryption	Watermarking	Fingerprinting
Specific rendering device needed	Yes	No	No
Embedded metadata	No	Yes	Yes
Embedded end licensee data	No	No	Yes
Content can be accessed without proper license	No	Yes	Yes

### 3.2.4 Repository

After identification and classification, digital contents are stored in a repository for subsequent distribution.

The repository may include both the contents themselves and the associated bibliographic documentation (the metadata resulted from the identification process). If the repository includes only metadata, it is usually called a bibliographic catalogue/gateway.

Repositories are used by content providers to store their content and by aggregators in order to collect materials from various authors/publishers/content providers for the subsequent delivery to the final user by using a single technological system.

#### 3.2.4.1 DRM Repositories

Storage systems in which the information regarding digital rights are stored and that operate (or rather "issue" such rights) after recognising user data, whether such data be personal data or regard the payment or pre-payment of the resources.

#### 3.2.4.2 License Storage

Storage systems which store the Licenses, or in other words, the set of usage rules and rights granted to the user for a specific content) that are delivered upon submission of User ID, and there are various kinds that can be divided by institute, class, or type of user (such as student or teacher). The existence of a storage process for the licenses to be

granted to final users obviously entails that the content provider has already defined the licensing model to be used for the content upon the definition of the business model.

### **3.2.5 Research and selection**

Final users can access repositories from an Internet site that may be either the site of the individual content provider or an aggregator's gateway.

In order to select specific contents, the users can adopt search engines that allow the resources to be chosen on the basis of various search keys such as those regarding content, age, class, and type, etc. (self-evaluation tests, supplementary exercises, interactive modules, etc.).

### **3.2.6 Sale**

After selecting the desired content, the user has various possibilities for acquisition or access of the same.

If the repository works as a bibliographic gateway for the acquisition of/access to resources, the user is usually sent to the content provider's site. This solution is often used in cases of co-operation between public agencies and private companies or if it is the public agencies themselves (usually the Ministry of Education) that promote the activity.

Whenever the websites of content providers or aggregators are involved, the contents can be directly acquired/accessed.

### **3.2.7 Content usage**

After acquiring digital content, in addition to accessing such contents autonomously from their computers, in some cases users can also use them on special assigned educational platforms or learning networks.

#### **3.2.7.1 LCMS/LMS/CMS educational platforms**

Educational platforms are software expressly developed for the delivery and management of digital education content by either accessing the e-Learning courses already structured or grouping single contents by starting from a repository on the basis of specific needs.

The more complex solutions allow the use of synchronous or asynchronous interaction instruments (in other words, interaction between participants may occur either simultaneously or subsequently) and let teachers manage and control student learning actions and progress.

The 5 fundamental functions of the educational platform are the following:

- Definition of the structure of a course in automatic mode;
- Monitoring of student learning and the planning of assessment tests;
- Management of students and classes through student ID recognition;
- Delivery of educational material;
- Development of the information through tracing systems.

### **3.2.7.2 Collaborative learning environment**

Another possibility is to use educational content in a collaborative learning environment.

This case involves the setting up of an “Intranet” in the school that allows teachers and students to distribute and access lessons and exercises in compliance with the academic programs and to both make and distribute assessments through the Web. The platform can be supplemented with communication and discussion instruments such as mailing lists and chat forums, etc.

In addition to accessing the repository, access to personalised training courses and/or services (such as tutors or reserved personal areas) can also be programmed.

Both teachers and students access the platform using user ID and passwords.

Interaction between teachers and parents may also be organised.

## **Section two**

## 1. Business models and case histories

As far as business models are concerned, we have seen in the previous pages that it is hard to define already existing schemes as the players involved in the educational digital content market and their relationships may vary from one case to the other and they tend to adjust their roles according to the target market to its particular needs and to the specific offer of the content provider. In second instance, each content provider – or generally speaking, each publisher – is more willing to adopt more than one single business model in order to cover different market segments and to “personalize” its offer. Therefore, we will try to list business models solutions taking into account the wider range of possibility, contextually providing clarifying existing case histories, following the pattern provided in the overall description of business model components.

It should be also taken into consideration that, as remarked in the previous part of this study and in the Introduction outlining the general educational context in which DRM and copyright issues register themselves, the adoption of complex DRM systems by educational publishing houses is far from being fully developed; on the contrary they tend to use hybrid solutions, managing certain aspects of the described digital content value chain (identification, storage, protection, delivery, licensing etc.) without setting up a real integrated system. It is, in any case, well worth examining those «experimental» models in order to highlight underlying trends and perspectives.

## ***1.1 Textbook publisher delivers its own content through its own web site or dedicated portal***

This is one of the easiest business models to describe as the players involved in the value chain are very few, and in the case under review only two: the publisher, who is also the owner of the rights to the digital content, and the end user. This also means that, from the digital rights management point of view, the deal is regulated by the license agreement between the publisher and the end user without third party intervention. As far as content production is concerned, the publisher usually a textbook publisher with a strong tradition in printed content production, develops or educational content following a cross media perspective: on-line and off-line, thus exploiting its own editorial know-how and resources. Very often the digital content delivered is made by adapting or integrating existing printed materials. The parts of content usually delivered are therefore not exactly interactive Learning Object, but text files, thus identified with a set of metadata compliant with the most widespread international standards.

Usually when digital content is delivered through a dedicated portal, resources are stored in a structured and searchable repository, but parts of educational content might also be found scattered on the publisher's official web site.

The choice of delivering digital educational content, developed by exploiting in-house resources and know-how, through a dedicated section of their web site or a portal is very common among traditional textbook publishers. This solution entails that all decisions concerning the adopted business model depend on just one single player: the publisher. Once the publisher has developed a kind of business in the field of educational digital content, it is also likely that the same content is delivered according to different business models, the most common of which is to take part to a delivery system launched by a public aggregator (e.g. Ministry of Education).

### **1.1.1 Cornelsen Media Center**

[www.cornelsen.de/teachweb](http://www.cornelsen.de/teachweb)

Cornelsen Publishing house is a very interesting case history as far as business models for educational digital content are concerned. Its on-line offer is very diversified according to the selected target: students, teachers or schools themselves. We will now focus on the offer of on-line content delivered directly from the publisher web site ([www.cornelsen.de](http://www.cornelsen.de)) within the framework of Teachweb, the section dedicated to teachers. Further examples of

Cornelsen business model can be found at the end of this chapter and might be classified in the following other business model categories: *Textbook publisher delivers its own content through an in-house developed e-learning platform* (Abitur on-line/Selgo), *Public aggregator gathers and delivers third parties' contents* (e.Fit NRW) *Gateway* (Bildung on-line) and *Learning environments* (Learnetix).

### **Content creation**

Teachweb is a section of Cornelsen website where teachers find:

- Extensions to textbooks, downloadable free of charge.
- Digital teaching materials stored in a repository called Media Center. Content is stored in subdirectories according to subject and classes (subscription or pay per download)
- Teaching ideas and activities taken from the news (pay per download or free for subscribers). Content created in partnership with "Die Zeit".

Materials are mainly text files (word and pdf), but also video and audio files are provided together with exe and zip files as well.

All content is copyrighted and Cornelsen is the owner of the rights.

### **Content identification**

No visible metadata scheme used a part from the field used for the research

Title

Class

Type of material

Number of pages

Price

Description

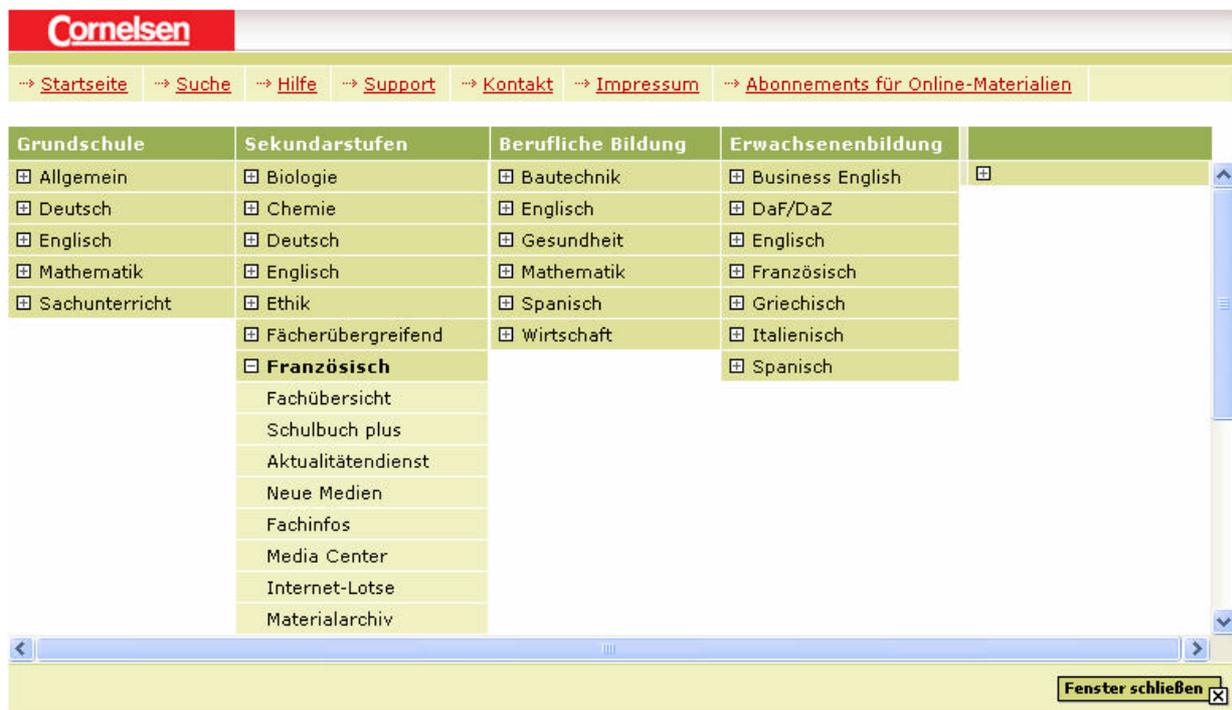
No protection measures on the files.

### **Storage**

On-line content and resources seem to be stored in a database/repository from which the user can retrieve different types of material according to the subject and to the school level.

### **Delivery**

As mentioned above, delivery occurs directly from Cornelsen web site, section teachweb.



## Licensing and pricing

Cornelsen Teachweb allows different licensing models according to the selected target:

Pay per download: price depends on the number of pages of the digital content

1-2 pages = 0.50 Euros

2-3 pages = 0.80 Euros

4-6 pages = 1.30 Euros

7-10 pages = 2.10 Euros

11-20 pages = 4.20 Euros

21-30 pages = 6.30 Euros

Price of audio and video files on request

Subscriptions:

- - teachers (5 Euros a month plus the entitlement to a 50% discount on pay per download prices)
- - schools (yearly full subscription for 349 Euros; yearly subscription for the latest 1,500 published materials for 95 Euros)

Contents from the section Teaching through the News are free for subscribers.

Payments are made through Bildung on-line (see chapter XXXX Gateway)

## Usage rules

Preview allowed, but displayed with enormous "watermark".

Contents may be saved and stored on school servers, Intranets or Network after approval by the Publisher. Contents should not be reused or modified.

Copyright protection complies with the German Law (§ 52 a UrhG)

### **Other Cornelsen educational digital content offers**

**Learnetix** (<http://lxten.learnetix.de>) is a learning community for students where the publisher delivers also interactive educational content. Access is free under subscription.

**e.FIT.nrw** is a project started in 2005 in Nord Reihn Westfalen thanks to a partnership between Cornelsen Verlag, Ernst Klett Verlag and the Regional Ministry of Education. The goal of e.FIT is to provide secondary schools with additional digital material for the subject "German". Cornelsen and Klett developed an Internet based learning platform and environment and filled it with content (over 3,000 learning units) while the Ministry has financed the project.

**Abitur Online** is a Blended-Learning course for evening schools in Nord Reihn Westfalen built to prepare students to take their degree. The platform (based on Centra Symposium) and contents have been developed by Cornelsen and Klett while the Regional Ministry of Education has financed the project.

**SeiGO** – selbst gesteuertes Lernen mit digitalen Medien in der gymnasialen Oberstufe – is a learning platform developed by Cornelsen and Klett with the goal of promoting autonomous learning by students in the latest years of secondary school. Content is provided by the two publishing houses according to their specialization.

### **1.1.2 Nathan Abcbac**

[www.abcbac.com](http://www.abcbac.com)

Ababac is a web site developed by Editons Nathan and devoted to students and teachers of the last year of secondary school, as it delivers aid materials, tests and digital resources for the preparation to the degree examinations.

#### **Content creation**

Content is created directly by Nathan with the technical cooperation of Havas Interactive Content identification.

All content is in pdf format, except for on-line tests.

#### **Storage**

Content seems to be stored in a structured repository, searchable by different keys (mainly by subject and type of school)

#### **Delivery**

Delivery to the final user is made by means of the Abcbac web site

## Licensing and pricing

Ababac web site provides more than one Licensing model:

Subscription: allows the user to download the whole content offer of Abcbac without any limitation and to take part in the interactive services provided by the site (forum, chat, etc.)

1 year	70 Euros
6 months	45 Euros
3 months	30 Euros
1 month	15 Euros

Pay per download: the user pays 0.56 Euros for each content

Download lump sum: special pricing is offered for in advance purchasing of a packet of digital contents.

20 documents	9 Euros	soit 4 fiches gratuites
30 documents	13 Euros	soit 6 fiches gratuites
50 documents	22 Euros	soit 10 fiches gratuites

## Usage Rules

Nathan is the only rights owner of the digital content and therefore all usages (copy, diffusion, reuse, modify etc.) for commercial purposes are not allowed. As far as educational exceptions are concerned, the final user may copy and save a backup copy of the content for its private use; while super distribution is allowed if for free and if copyright ownership is clearly indicated.

## Other Nathan educational digital content offers

Nathan develops multimedia on-line and off-line content and delivers it through specialized web sites. The publisher also participates in Canal numerique de savoir and in partnership with Editions Bordas ever since 2000 for the development of electronic textbooks.

## ***1.2 Textbook publisher delivers its own content through an in-house developed e-learning platform***

An e-learning platform with the name of LCMS (Learning Content Management System), is a software that allows the delivery and management of digital learning contents whether they are mono- or multi-media content (text formats or learning interactive units with embedded video, audio, or animation). Complex platforms also offer interaction and communication tools, such as forum, chat, e-mail services and the possibility to monitor and evaluate student activities and goals achieved.

LCMS usually allows five core functions:

- course structure definition
- learning process evaluation and test setting
- student and virtual class management
- learning content delivery and storage repository
- information and user tracking system

Having a learning platform implies that the digital content delivered (Learning objects) should comply with the most widespread international standards because platforms themselves are generally standardized (mostly Scorm compliant). It would not be wise to develop an in-house learning platform that required proprietary content formats because the publishers would not be able to deliver the same content in other ways, by means of an aggregator, for example.

Like the one described above, this business model considers the educational publisher as the main player. It goes without saying that an educational publisher must also have strong ICT know-how in addition to editorial and content production. This usually happens when an e-learning provider becomes (or is) a spin-off of an educational publisher so that content and technology might easily coexist.

### **1.2.1 Garamond**

[www.garamond.it](http://www.garamond.it)

Garamond provides e-learning courses in order to train Italian teachers in the use of ICT in schools and other key issues of educational relevance.

#### **Content creation**

Content is developed directly by the publisher, who is also the rights owner. Authors of the contents are paid according to the number of “students” enrolled in each course.

### **Content identification**

Content is made of Learning objects described according to DCMI (Dublin Core Metadata Initiative), while the LCSM platform assures Scorm compliance.

### **Storage**

Content is stored in the platform repository that allows dynamic and modular access for each single course.

### **Delivery**

Delivery of e-learning courses is made through the in-house developed LCSM platform “Kairòs” that allows multiple user profiles (learner, teacher, tutor, administrator) and provides a text editor in order to distribute multiple format files (text, audio, video, animations, sound).

### **Licensing and pricing**

Licensing model is under subscription (for each course)

Single course 120 Euros.

Master in E-learning 600 Euros.

Remunerative business model according to the ROI analysis

### **Usage Rules**

The Platform tracks users and their actions. There are not many downloadable materials because the platform is built to allow on-line use.

### **Other Garamond on-line content offers**

"Libri in rete" (Textbooks on the net) is a new service offered by RCS Education that provides extensions and other educational materials relating to printed textbooks through the Garamond learning platform, Kairos. The access is granted to all teachers who use RCS Education textbooks during school lessons. Project in progress.

### ***1.3 Private aggregator gathers and delivers third party contents***

A content aggregator is an individual or organization that gathers Web content from different on-line sources for reuse or resale. Usually aggregators do not only collect third content but also offer value added services, such as, for example, integration with other material, standardization of collected content, marketing activities. A key factor that highlights the importance and the role of content aggregators in the digital educational content market is the compliance of all collected materials with the same international standards. Standardization and interoperability is, in fact, a basic need both for the aggregator and for the educational publisher (or the content provider): the first must apply the most widespread standards in order to be able to collect the broadest number of content providers' resources, store them in a common and searchable repository and stay in a quickly updating market; the latter should think in terms of standardization in order to be able to reach a wider audience and to diversify business models and delivery solutions.

Private aggregators operating in the digital educational environment collect resources not only by educational publishers but usually also by other content providers, such as newspapers, tv broadcasters or e-learning content developers, in this way enabling the user access to a very complex and articulated offer.

Educational publishers should be the main content providers because they have skill, experience and knowledge in educational content production. Reliance on an aggregator could also be a good opportunity for small-medium publishing houses that cannot afford to enter the digital market by developing their own in-house delivery system. All these publishers would have to do is define their business model, pricing and licensing while the whole business process would be managed by the aggregator. It is clear that this business model implies more than one actor playing along the value chain and therefore the publisher (content provider) must regulate economic relationships not only with the end user but also with the aggregator offering the service. Given that aggregators, especially if they are private companies, have their own business model, publishers that take part to the aggregation service have to pay for it, most likely by means of a subscription and through a kind of revenue share for the content sold through the aggregator.

### 1.3.1 ProQuest Learning

[www.proquestlearning.co.uk](http://www.proquestlearning.co.uk)

#### **Content creation**

ProQuest aggregates content from a variety of rights holders, from journal publishers, educational publishers specialised in different subjects (Routledge, Fitzroy Dearborn, Macmillan; NATE, Folens, Oxford University Press, RM to name but a few) and image libraries. These rights holders are remunerated in two basic models:

1. Fees
2. Royalties, paid based on
  - a) usage within the service,
  - b) relative data size,
  - c) the relative value of the content and the service.

ProQuest also commissions materials directly from teacher-authors, in which case it holds copyright.

There is a tracking system of the usage of all content within ProQuest services in order to report it back to rights holders.

Audio and Video require Real player or Windows Media Player. Animation and interactives are Flash. Text content are in pdf format

#### **Content identification**

Contents delivered by ProQuest are Scorm compliant Learning Objects

Content is therefore described by two different sets of metadata according to the Platform from which they can be retrieved.

- Curriculum Online
- Kaleidos (the scheme created by RM [www.rm.com](http://www.rm.com) for their proprietary MLE)

As far as content protection is concerned, the first level is to secure access to the web sites in order to prevent unauthorized access. This may happen:

Authentication through IP address

Authentication through username and password

#### **Storage**

Content is stored in repositories on ProQuest servers.

#### **Delivery**

Via dedicated web sites

ProQuest Learning publishes 6 Web sites which are hosted on ProQuest servers:

- ProQuest Learning: News
- ProQuest Learning: Library
- ProQuest Learning: History

- ProQuest Learning: Literature
- ProQuest Learning: Literature Colleges Edition
- ProQuest Primary: News

### Licensing and pricing

Schools pay a subscription to access the services over the Web, either from within the institution or from the students' own homes. There is no limit on the number of simultaneous users.

ProQuest services are sold on an annual subscription basis, with pricing based on the size of institution. ProQuest sells e-learning services to primary schools, secondary schools, and Further Education institutions in the UK.

The services are Curriculum Online accredited, meaning that we can accept e-Learning Credits from English schools.

ProQuest also sells on a consortium basis to local education authorities in England, and education authorities in Scotland.

#### ProQuest Primary: News

School size	Annual subscription
< 50 pupils	£80
51 –150	£160
151 – 300	£220
301 – 450	£300
> 451 pupils	£380

#### ProQuest Primary: Library

Number of KS2 pupils *	Annual subscription
< 25 pupils	£150
26 –75	£250
76 – 150	£350
151 – 225	£400
> 226 pupils	£450

#### UK Secondary Price List- Annual Subscription

School Size	Literature	News	Library
Under 500	£220	£450	£800
500-1000	£400	£600	£950
Over 1000	£550	£800	£1150

#### International Schools Price List - Annual Subscription

Service	Site Access
ProQuest Learning: Literature	£595
ProQuest Learning: History	£595
ProQuest Learning: History with Class Kits	£695
ProQuest Learning: News	£650
ProQuest Learning: Library	£1100

## **1.4 Public aggregator gathers and delivers third party contents**

Although aggregators are not always private companies, it is quite common in the educational world that their function is decided by a public institution, such as the National Ministry of Education, which usually has financed and launched a project to grant access to digital educational resources to schools and often also finances the purchase of the content delivered on-line. Because public aggregators pursue non-profit goals and offer a public service, they usually tend to set rules in order to participate in the collecting service. Public aggregators also usually provide various information services for the educational world.

Educational publishers should, of course, play a big role in content providing, even though it sometimes seems that the public tends to develop educational content on its own (e.g. commissioning resources to pools of experts), thus keeping educational publishers in a marginal position.

It shall also be understood to what extent participation in a public aggregator service is linked to some kind of quality certification of the digital material and who is in charge of approving or rejecting the content. This issue is, however, usually closely linked to the system of selection and approval of textbooks in each country's education system. We might therefore imagine a "quality assessment" for educational digital content that regards only the structure of the content (e.g. compliance with international standards, metadata, level of interactivity required) more than a control on the content itself.

### **1.4.1 Textbook extra**

[www.bildung.at](http://www.bildung.at)

#### **Content creation**

Web-based learning materials and content additional to textbooks. Content is provided by educational publishers. Content developers who develop LO from rough content by publishers are paid by textbook publishers according to the partnership with the Ministry. Authors themselves are also paid according to the complexity and interactivity of the desired material.

Simple materials (for example Powerpoint presentations) – free of charge.

Simple Modules - max. 250 Euros;

Modules with simple animations - max. 400 Euros.

Modules with complex animations and integrated videos - max. 500 Euros.

Very complex and articulated modules – prices on demand

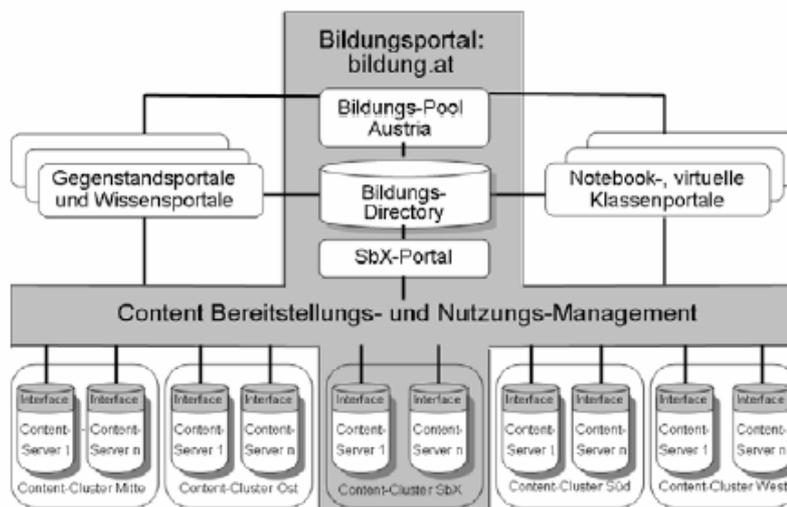
Textbook extra started as a pilot project in 2003 and is the result of a partnership between Federal Ministry of Education, Federal Ministry of Social Affairs and Textbook Publishers.

## Content identification

Content is structured in learning object following its own metadata-specification based on IEEE LOM and Dublin Core, matched with the EUN schoolnet, <http://e-Learning.bildung.at>  
Content is protected against unauthorized access now over the portal identity & access management of bildung.at, and in the next two years will be protected via chipcard-authentication and possibly watermark.

## Storage

Content is stored in structured repositories in separated servers of Bildungs Portal



## Delivery

Access and identity management via national portal bildung.at, usable over decentred and distributed content pools. The entrance-portal and deployment environment is financed by the Federal Ministry of Education, the content is financed by the Federal Ministry of Social Affairs combined with a shared payment-model by parents. A DRM system is also being planned.

## Licensing and pricing

According to the electronically ordering [www.schulbuchaktion.at](http://www.schulbuchaktion.at) all schools automatically obtain their access rights via bildung.at

## Usage Rules

The tracking and statistical information is collected and controlled by the entrance portal. To date, pupils have only reading access over the portal only for paid content at the content pools. Future plans include further development with collaborative learning environments and content-usage in learning management platforms .

## 1.5 Gateway

A gateway could be defined as a bibliographic database for digital (but also print) content. In the same way as an aggregator gathers third party content, a gateway gathers information on third party content, thus helping the user to search and find the most suitable materials. In order to access and purchase the digital content the user is obviously then routed on the content provider's delivery system. We could call this a kind of metadata repository of content. Usually gateways of educational resources are "sponsored" by public institutions, mostly in those countries where schools receive funding to purchase electronic resources.

Relying on a gateway for an educational publisher does not mean anything else than having a wider visibility and reaching a broader audience because it always has to have its own delivery system and therefore its own business model defined.

### 1.5.1 Bildung on-line

[www.b-o.de](http://www.b-o.de)

Bildung on-line is a catalogue of educational resourced (books, off-line and on-line materials) powered by VDS Bildungsmedien (once Textbook Publishers Association) that provides easy access to the offer of partner publishers thanks to the researchable structure of the database in which metadata on contents are stored. Bildung on-line was at first created by four textbook publishers (Cornelsen, Klett, Schroedel, Westermann) and now counts 15 publishers and is open to others. As far as educational digital content is concerned, Bildung on-line catalogue hosts more than 6,000 titles.

#### Content creation

Bildung on-line is just a gateway to publisher resources and therefore contents are created by the publishers themselves (Cornelsen Diesterweg Hueber Klett Oldenbourg/bsv Paetec Park Körner Verlag School-Scout Schroedel Schule Online Verlag an der Ruhr Volk und Wissen Westermann, just to name some of the most active in the on-line field)

#### Content identification

Publishers must submit metadata to the b-o system in order to feed the database. Criteria and list of required metadata is provided by Bildung on-line. Description seems to comply with the most widespread international standards. From the publisher's point of view, taking part in Bildung on-line implies that all their on-line contents must be identified and described according to the guidelines provided, therefore also taking into account each publisher's offer (on its website for example or on [www.school-scout.de](http://www.school-scout.de), an on-line bookshop dedicated to educational materials that delivers also digital content) it is likely to detect the same metadata structure.

### **Storage**

Bildung on-line is a gateway, and therefore content are stored directly on the publishers' servers. In the Bildung on-line database, only metadata concerning digital content are stored, managed and maintained. The business model of b-o (to allow publishers to take part in the service) is subscription on monthly or yearly base. Prices differ according to the number of materials (metadata) stored.

Pricing (50% discount for members of the VDS)

0 -100 resources: 16 € a month 192 € a year

100 – 2.000 resources: 32 € a month 384 € a year

more than 2.000 resources: 80 € a month 960 € a year

### **Delivery**

Bildung on-line is a gateway, and therefore content are delivered directly through the publishers' web sites

### **Licensing and pricing**

Licensing models are decided by publishers. All payments are however to be made through a common system ([www.bildungsnetz.de](http://www.bildungsnetz.de)). All partner publishers take part in this system also if they sell content directly on-line from their website.

### **Usage Rules**

Usage rules are decided by publishers.

## **1.5.2 Canal numerique de savoir**

[www.cns-edu.net](http://www.cns-edu.net)

CNS is a catalogue of educational electronic resources set up thanks to a partnership between the French Ministry of Education and 33 educational content providers.

### **Content creation**

Content is created by educational publishers or content providers such as newspapers, reference publishers, journal publishers, audiovisual and multimedia companies. They also remain the content rights holders.

### **Content identification**

Identification and protection of contents aggregated on the platform (gateway) is up to the content provider and does not depend on Canal numerique des savoir.

### **Storage**

CNS is a gateway, and therefore content are stored directly on the content providers' servers

### **Delivery**

CNS is a gateway, and therefore content are delivered directly through the content providers' web sites

### **Licensing and pricing**

Licensing models are decided by content providers. CNS provides only pricing indication

### **Usage Rules**

Usage rules are decided by content providers, however all contents listed in CNS could be purchased and used by schools but also by single teachers or students.

## ***1.6 Textbook publisher provides schools with a bundle of contents***

A rather uncommon solution, this business model implies that a single content provider, such as an educational publisher has highly developed and interactive content, infrastructures and ICT skill to offer an all inclusive solution to schools. Obviously enough, the business model can be sustainable only for large size educational publishers, usually part of a corporate group with assets in other industries of the content market.

### **1.6.1 Pearson KnowledgeBox**

[www.uk.knowledgebox.com](http://www.uk.knowledgebox.com)

#### **Content creation**

Content is created by Pearson Group publishing houses (Pearson Longman; Dorling Kindersley; Pelicanforschools; Puffin) and integrated with interactive content from content providers like Channel 4.

KnowledgeBox is capable of ensuring that all digital resources are automatically updated. By supporting teachers with a variety of digital resources, ideas and tools, KnowledgeBox helps them deliver some of the most difficult aspects of the National Curriculum and National Literacy and Numeracy Strategies in engaging and creative ways.

All contents are developed in Flash.

#### **Storage**

KnowledgeBox resides on a simple, easy to maintain web application that plugs directly into a school's or LEA's local area network. In this way, KnowledgeBox facilitates immediate access to rich digital learning resources from every computer in the school at the same time by making use of the school's Internet connection.

KnowledgeBox sits on a server within the school and links to every desktop PC. It can also be used by the whole class using a projector or electronic whiteboard.

#### **Delivery**

KnowledgeBox can be used to assign lessons to children working individually, collaborating in small groups at class workstations, or in computer suites.

KnowledgeBox is certified to run on a number of different server platforms, all of which use Linux as an operating system and embrace the use of open source or free software components like the Apache Web Server. These servers, which Pearson Education

certifies as KnowledgeBox compatible, can be procured directly from KnowledgeBox or via our hardware partners. Alternatively, if your school already has a compatible server, we can install the KnowledgeBox system and content onto this server.

Currently KnowledgeBox runs on two classes of server: a caching server, "KB-Cache", which provides BECTA-compliant caching functionality in addition to KnowledgeBox; and a "KB-Basic" server, which is a dedicated server providing only KnowledgeBox.

### **Licensing and pricing**

Licensing requires the payment of a lump sum for the set up of the system, plus a yearly (or multi yearly) subscription for the updating of content.

<b>Content</b>	<b>price/Euros</b>
KB essential	2,200
Digitext Wave One	600
PB Bear – Fundation Stage	250
Science Key Stage One	250
1 year KB refresh	600
2 years' KB refresh	600
3 years' KB refresh	1,000

<b>Hardware and services</b>	<b>price/Euros</b>
Training	350
One day's installation	350
KB Basic Server	550
KB cashing Server	900

## **1.7 Content aggregator provides schools with a bundle of contents**

In general, this solution closely resembles the typical function of a content aggregator that gathers third party educational resources and delivers them to school. In this case however, the access point is not a web site with a repository in which users can select the desired materials, but rather an all-included offer to schools where contents produced by different content providers have been structured and “packaged” in order to create consistent lessons. This means that licensing to the end user is totally up to the aggregator which actually sells a product, while educational publishers have to manage economic contracts with the aggregator itself.

### **1.7.1 Espresso Box**

[www.espresso.co.uk](http://www.espresso.co.uk)

Espresso is a UK educational broadband content company.

Espresso is a comprehensive, easy-to-use, and constantly growing digital library of high quality, innovative, video-rich, cross-curricular resources, all tailored to the National Curriculum and cross-referenced to QCA schemes of work.

Espresso is available in several forms: a Primary service for schools (Foundation, Key Stages 1 & 2), a Primary at home service for parents and children, and a Secondary service (Key Stages 3 & 4).

#### **Content creation**

Content is developed by educational publishers, tv broadcasters, journal publishers and other specialized content providers.

#### **Storage**

Espresso is stored on a cache server in your school or within your local LEA network so that full-screen videos and other broadband resources can be accessed immediately by multiple users without the download delays associated with the Internet.

#### **Delivery**

EfS is delivered in two ways - on the hard disk in the Espresso Box (a server included ) and by a minimum of 36 Transmissions per year. Transmissions normally occur weekly

during term time and are generally sent via satellite, but they may be transmitted by other means.

### **Licensing and pricing**

Espresso pricing is based on an annual subscription

#### **Espresso for Primary**

List price for Primary is £6 per pupil per year. Prices may vary depending upon school's:

- LEA
- Regional or authority-level broadband consortia
- ICT infrastructure

#### **Espresso for Secondary**

£3 per pupil.

PE for GCSE costs £300 for a one-time site license.

### **Usage Rules**

Espresso grants the non-exclusive right for the Contract Period to

- receive Transmissions
- use the EfS content, software and software materials delivered in the Espresso Box and via Transmissions for educational purposes.

## ***1.8 E-learning environment offers services and gathers educational content***

It is rather difficult to classify this kind of business model because the players in the value chain are quite many and different. Basically, the features of this solution can be summarised as follows:

- Existence of a structured portal developed either by a private company or in partnership with a public institution
- Existence of an information service on the changes occurring in the educational environment
- Existence of a repository or gateway of digital educational content.
- The service is usually provided as non-profit, even if charges are sometimes asked for content delivered.

Content could be developed and implemented directly by the users community or provided by commercial content providers (educational publishers or e-learning content providers) or by pools of experts involved in the project.

This is a very interesting business model because schools, teachers and students are directly involved in the process of content creation and knowledge growth. Therefore they feel more engaged. Otherwise it is still not clear how the relationship (even economic) between the parties shall be regulated. The following case studies are good examples of the different forms the model can take and the freedom of choice that content providers still have in defining their business model towards the service.

### **1.8.1 Kennisnet**

[www.kennisnet.nl](http://www.kennisnet.nl)

Kennisnet is a non-profit Foundation established by educational professionals and acts as a content and service broker, matching demand with supply, and creating a context in which access to the available services is both simple and clear. With more than 600,000 visitors per week, Kennisnet is the instrument to access education in The Netherlands.

The foundation focuses on the users as well as the suppliers of content and services, such as libraries, museums, broadcasters, publishers and software suppliers.

Kennisnet distinguishes between three building blocks:

- content: offering content is the most important building block, and can be found at [www.kennisnet.nl](http://www.kennisnet.nl);

- services: offering ordered, transparent, safe and tailor-made content is the second building block. An example of these services is Entree;
- infrastructure: a properly working infrastructure is the third building block. Kennisnet supervises the proper operation of the infrastructure, on behalf of the Ministry of Education, Culture and Science. Until the end of 2003, this has been subcontracted by the Ministry to a consortium of cable companies.

### **Content creation**

Kennisnet Foundation is not a developer of e-learning services but provides third party non profit and commercial content through the online service portal, which features free e-learning services but also e-learning applications or services with commercial interest. The e-learning services that Kennisnet Foundation distributes are usually licensed to corporate companies and these products are framed in the e-learning instruments which Kennisnet provides. This means that Kennisnet does not develop its own e-learning services but uses third party products distributed through the Kennisnet service platform into the public domain.

Kennisnet has subscribed several partnerships with content providers and educational publishers as well.

### **Content identification**

Content is structured in Learning Objects, following the LOMv1.0 scheme.

The used metadata schema is IMSv1.2.1 (for now) on top of which Kennisnet uses an application profile called "BVE content-zoekprofiel v1.0.2".

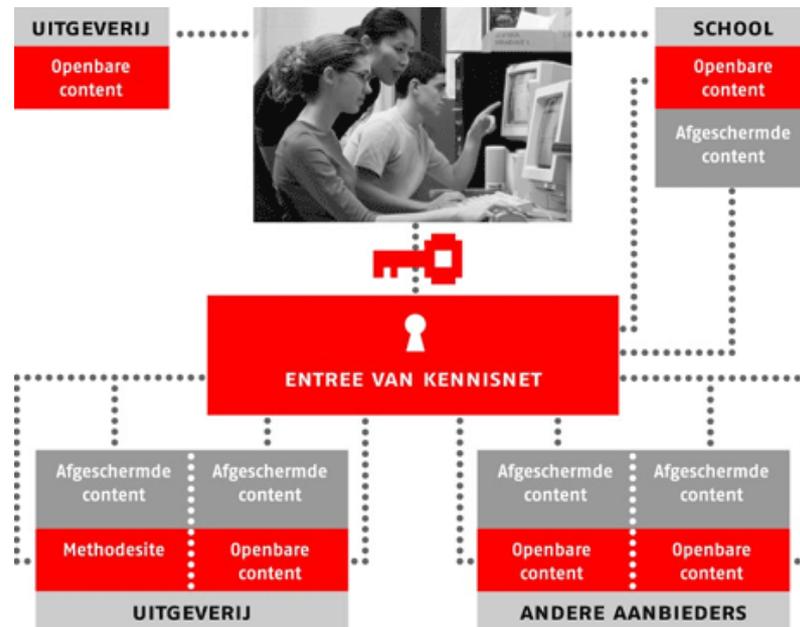
Metadata used should reference the IMS binding.

### **Storage**

By each "connected websites" + own repository for self developed materials

### **Delivery**

Entree is the standardized access service for educational institutions in the Netherlands. Teachers, learners and educational facilitating personnel can get access to framed (from public Internet access) online services with one universal key. These online services can, for instance, consist of methodological websites, educational publishers' websites or contents, administrative online applications from government institutions or other educational services. There is also the possibility that websites from a specific educational institution are framed from public access. The single log-on principal from which Entree operates offers usability. The management pressure decreases because through the use of Entree the users are registered in one system and one system alone.



### Licensing and pricing

Everything produced by Kennisnet Foundation is delivered free of charge; while as far as content developed by third parties, content providers and rights owners must choose to adopt a specific licensing model.

### Usage Rules

No uniform usage rules prescribed. The decision must be made by the content provider

## 1.8.2 Sulinet

<http://sdt.sulinet.hu>

The Sulinet Express Program operates with support from the Ministry of Education, the Ministry of Information Technology and Communications and the Ministry of Employment and Labour.

The content development strategy of Sulinet might be determined according to two target areas:

- The Sulinet webpage – The goal is to operate a well functioning educational portal, which is visited approximately by 50.000 users a day.
- Development of digital educational auxiliary materials, which are usable in the field of the public education as open source.

### Content creation

Sulinet Digital Knowledge Base is a digital curriculum database and a content management tool. The developed learning materials cover the curriculum of the different

grades according to knowledge areas. The main goal that we would like to achieve is to create a complete curriculum database. Digital material now covers the curriculum of grades 9-12 in some subjects (History, for example) or grades 7-12 in others (for example Hungarian Literature and Grammar). The structure of the digital materials is stored in SDT, while pictures, texts, video and sound files are the elements. The so-called pages are made up of these elements. Learning objects consist of pages. These might be worked off within 10-40 minutes, while themes are the biggest units.

### **Content identification**

The internal storage of data and publishing occurs in compliance with international standards (SCORM, IMS, LOM, Dublin Core) towards the enhancement of independence from the content-suppliers and the portability of the content.

### **Storage**

One of the most important aims of the Sulinet Digital Knowledge Base is to create LOs of stable value. LOs are stored in a storage unit which is independent of tools. Stable value is important, because in this way we do not have to modify the LOs if a new kind of educational tool is going to be used sometime in the future and these LOs are still going to be usable.

### **Delivery**

This system is not a course-based system but an LCMS system. It contains different reusable elements (pictures, texts, sound- and video files) and users have the opportunity to create their own LOs from thousands of elements. Of course there are also complete digital learning objects to use, but if somebody would like to change anything in the LO or wants to use only some part of it, or only a picture or text, this is also possible.

### **Licensing and pricing**

Free access

### **Usage Rules**

Users might display or edit the LOs. There are different collaborative tools to use (for example forum, chat) which enable users to work on the same project at the same time. If a user edits an LO or creates a new LO he or she can store it for example on his or her own computer, but of course these LOs cannot be just simply put into the system, first they need to be checked by experts of the Sulinet Program Office. These newly created or modified LOs might be used for private goals (for example a teacher can use it during class), they might be used for working groups (for example History teachers in a school create a working group, and they exchange these LOs) or they can publish it through the earlier mentioned process. These published LOs might become public properties or so called valuable public properties, which are the best LOs. There is an open forum, where

general questions might be asked and answered, but closed forums might be also created. For example a teacher gives out an exercise to the class. He divides the class into working groups. He can create closed forums, where the members of the different groups can exchange their thoughts or ideas. With help of the export import function LOs might be exchanged between our and other systems. Everyone is able to reach the Sulinet Digital Knowledge Base through the Sulinet Education Portal. Right now the surface and the LOs are available only in Hungarian but we are planning to translate the surface and some LOs, too, so they are going to be available in English and probably also in German, and everybody is free to use them for non-profit purposes.

### 1.8.3 SEI Educational System

<http://portal.edu.ro/>

The IT Based Educational System program was initiated by the Romanian Ministry of Education and Research in 2001 with the main objective of supporting the learning/teaching process in the undergraduate learning system with latest IT tools. The Program is implemented in partnership by the state administration (RMER) and the private sector (SIVECO Romania SA, HP and IBM). SEI is aiming to provide all schools in Romania with complete IT solutions for use in the teaching/learning process. The main components of the solution are:

- Hardware (IT laboratories)
- Learning & Content Management Solution (the AEL software system)
- Educational software and electronic educational content;
- Teacher training;
- Internet connectivity.

For the purpose of Ormee study we will focus on the offer of digital contents and their delivery through the AEL platform.

#### **Content creation**

Within SEI, 16 dictionaries: explanatory, orthographic, synonyms, antonyms, Romanian-English-French etc.; encyclopaedias and glossaries of terms, movies, art, poetry and theater: Encyclopaedia Britannica – the concise edition etc. have already been distributed in all high-schools.

Moreover Siveco and Altfactor (multimedia company specialized in e-content and e-learning solutions) have developed 530 multimedia lessons available as packages for 10 subjects –rigorously elaborated, considering psycho-pedagogical impact and curricula coverage

- 65 for biology;
- 96 for mathematics;

- 70 for computer science;
- 3 for history;
- 27 for geography;
- 48 for chemistry;
- 48 for chemistry;
- 115 for technology;

All the themes included in these packages, as well as the content, were approved by curriculum commissions specially appointed by the Ministry of Education and Research. Content can be structured and adapted upon teacher's needs, and enriched with metadata related to curricula, keywords, version, author etc.

### **Content identification**

AEL as a multi-tier system - with a thin, web client connected to a Java based web and application server. It employs Enterprise Java Beans, Jdbc, Java servlets, jsp-s, Java applets, and makes extensive use of XML. Considering the need for content interoperability; the content packaging formats are based on XML and AEL implements support for standard content packaging and interoperability formats like MathML, SCORM and IMS.

### **Delivery**

Within the SEI framework, digital content is installed in all the high schools on the software computer assisted platform AEL, most of them being available for download by the pupils and teachers on the SEI Educational Portal.

The standardized high-school IT classroom consists of 1 server, 25 workstations, printer, scanner, equipment for networking and Internet connectivity. Manufacturers configure the computers with basic operating software: operating system, email server and email clients, software firewall, office software and anti-virus software.

The backbone of the program was the Learning and Content Management System AEL – Advanced e-Learning, which was implemented in all 1,510 Romanian high schools. The AEL e-Learning platform is an integrated teaching/learning program and content management system, based on modern educational principles and technologies. The AEL e-Learning platform offers support for teaching and learning, for tests and evaluations, for managing the educational content, for monitoring the educational system and creating the curricula.

AEL is an integrated Learning and Content Management System developed by SIVCO aimed to support professors/tutors, students, content editors, administrative staff and other stakeholders in the learning process.

### **Storage**

Digital content is stored in the AEL platform knowledge database, which acts as a content repository and management solution, adaptive, configurable and searchable, which allows:

- to create content (built-in HTML editor, mathematical formulae editor, test editors and wizards, glossaries/dictionaries editor);
- to import/export content from files, archives/folders of resources, standard packaging formats like SCORM and IMS;
- to adapt or modify content;
- to derive their own courses from common content components.

Access privileges on user/user-group level may be applied to any part of the knowledge base. The knowledge base may be browsed hierarchically, filtered or searched.

### **Licensing and pricing**

Free access

### **Usage rules**

Thus content is freely accessible, usage rules are very well described.

The right to download and use the packages is restricted to pupils enrolled in the Romanian public undergraduate educational system and teachers employed with the Romanian public pre-university educational system who need the packages in their work within the high-schools.

The Users' usage of the digital content is done pursuant the Author Rights Law No. 8/1996 and the Users are not being granted any right to sell or rent digital content on the local or international market or obtain benefits of any kind from distribution or usage.

The Users are not entitled to create any kind of software products derived from or similar to the packages, with the exception of the packages developed by a personal technical contribution from the User important enough to define the final package as a new package. The Users are entitled to create new lessons by re-organizing the existing content, provided that they keep the original content unchanged and that all the modified files contain clear and visible reference to the name of the author of the modifications, as well as the modification date. This new content can also be redistributed, provided that the access is granted for free.

The Users may copy and distribute unmodified copies of the digital contents, in the form they receive them, under the condition to specify clearly on each copy the author and the source, to keep intact all the notes regarding the terms and conditions of use provided and the limitation that there are no warranties and to distribute these terms and conditions with every copy of content.

## **1.9 E-learning content e-platform provider develops a courseware solution**

If, in the previous business models described, educational publishers tended to play a more or less significant role in the content creation process, this latest solution is totally up to players traditionally outside the educational/publishing market. Here the main player is a technology provider specialized in e-learning, both on the platform development side and on the content (learning object) side.

Which role might educational publishers play? Apart from the case history provided here where publishers are themselves a target client, they might be able to act as partner for the development of reliable contents.

### **1.9.1 Universal Curriculum – Young Digital Poland**

[www.universalcurriculum.com](http://www.universalcurriculum.com)

#### **Content creation**

The Universal Curriculum content is prepared as a generic pool of electronic resources, flexible enough to be adapted to any national curriculum, particular textbook or specific teaching concept. The pool of UC content consists of thousands of Learning Objects, which may be easily translated, rearranged or modified to fit a particular language or purpose. Based on research carried out in various countries, Universal Curriculum is created with multicultural and language-independent content that can be used in the majority of designed for education systems at the level of primary and secondary school.

#### **Content identification**

All content objects are delivered in the form of open XML files, which are dynamically interpreted by a lightweight Flash-based plug-in to display on the user's screen. This approach allows the UC content to be playable on practically any operating system (Windows, Mac, Linux) and accessible via any Internet browser (e.g. Internet Explorer, Netscape, Opera, Mozilla etc). Thanks to the open, XML-based architecture the content may be easily adapted to any modern or future devices such as PDAs or 3G mobile phones. Universal Curriculum's content may be deployed on an online server or via standard offline media such as CD-ROM or DVD-ROM. All content is prepared according to AICC/SCORM standards so it may be instantly deployed and registered within the majority of commercially available Learning Management Systems (LMS).

#### **Delivery**

UniversalCurriculum is aimed at three distinct types of clients:

- Textbook Publishers, which intend to supplement or extend their traditional textbooks with top-quality, highly interactive electronic content, thus creating modern, integrated teaching and learning methods;
- National Ministries of Education, or local government organisations, which intend to provide access to a wide spectrum of modern e-Learning materials for schools, teachers and pupils, thus increasing the effectiveness and appeal of education;
- K-12 e-Learning Portals, or other Educational Service Providers offering comprehensive electronic study materials and Virtual Learning Environments for schools and/or individual pupils.