Textbooks and digital contents in Italy: future perspectives and some challenges

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MIUR

Agenzia Nazionale per lo Sviluppo dell'Autonomia Scolastica
ex Indire

The National Documentation Institute for

Innovation and Research in Education

based in Florence

Agenzia Nazionale per lo Sviluppo
dell'Autonomia Scolastica
ex **indire** - IRRE

Italian Ministry of Education

Direzione generale per gli Studi,
la Statistica e i Sistemi Informativi

*Ministero dell'Istruzione
dell'Università e Ricerca*

http://www.istruzione.it/web/istruzione/piano_scuola_digitale

• Introducing Interactive Whiteboards *(30.000 IWBs)*

• Promoting Classrooms 2.0

(>400 classroom experimenting innovative settings)

• Supporting Digital textbooks and innovative educational contents

(digital textbooks, public competition for publishers)

Agenzia Nazionale per lo Sviluppo
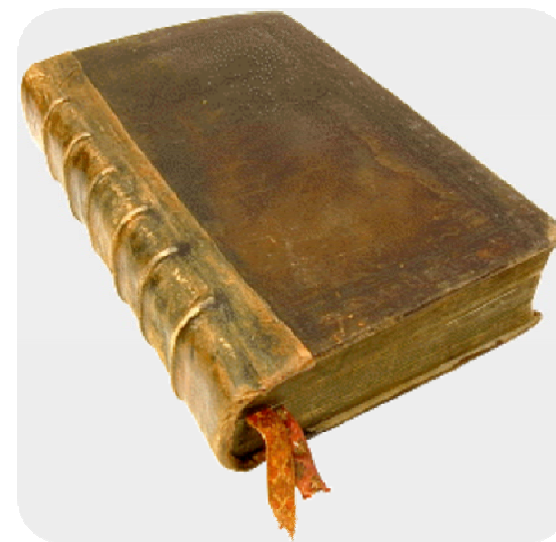dell'Autonomia Scolastica
ex **Indire** - IRRE

A law regarding school texts has been introduced by the Ministry of Education:

Decree n. 133/2008

...from 2011/12 schools will adopt either on line **digital books** (A) or **mixed book** (B)...

(A)   Online downloadable digital versions

(B)   Paper + multimedia extension

Characteristics of the digital or mixed books (Annex 1/B of Decree n. 41/2009)

Pedagogical principles

- Avoid cognitive overload
- Support customization to learning styles
- Learner engagement
- ….

Technology requirements (guidelines in progress)

- Provide content in common file formats
(if proprietary format: provide the software)
- Compatible with the most widespread hardware
- Enriched by multimedia communication codes: hypertext, interactivity, animations, audio, video, images
- Include browsable navigation menu
- Provide opportunity for students to use text-based features: bookmark, highlight, annotate..
- Include customizable content delivery - Provide search features, online guide, support to download content and data
- Use the Internet to enable families to update information, content and other related data
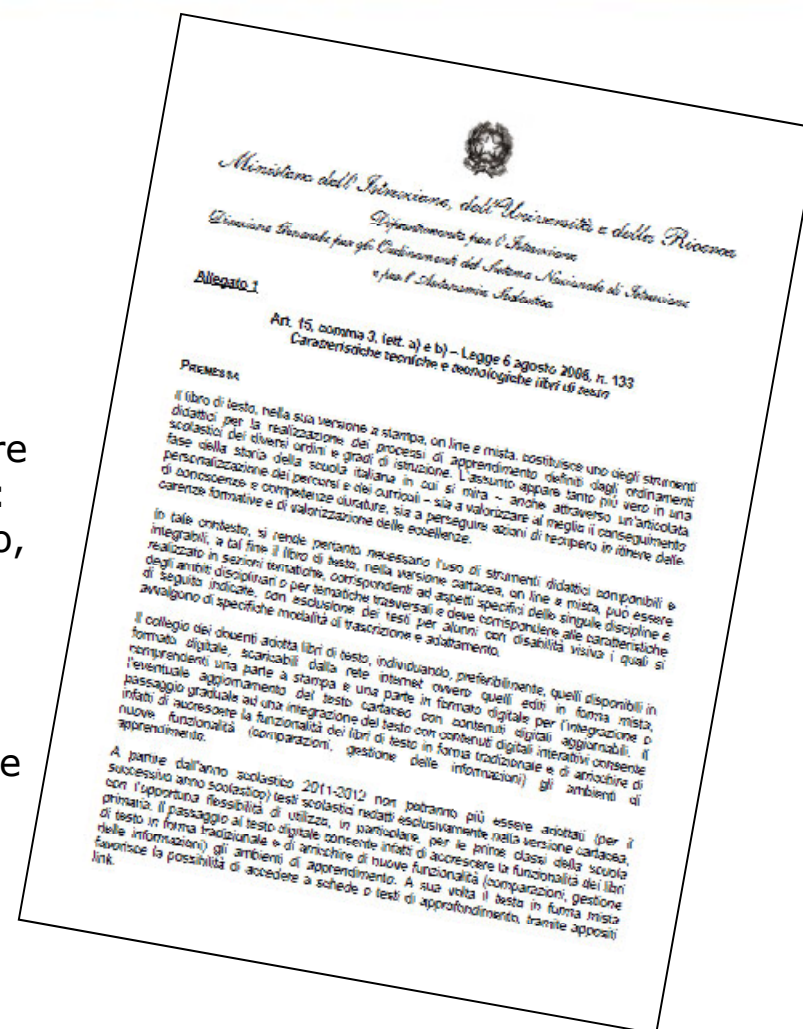
http://archivio.pubblica.istruzione.it/news/2006/libri_quadro.shtml

Public competitions for innovative educational publishing products for schools

CONTENT STRUCTURE

• **Content presentation**

(Learning Goal Alignment,

Customizable for different learning needs,

Match to the curriculum,

Search facilities, Integrated by web pathways,

Reusability, Cognitive pace controllable by student..)

• **Dynamic features and interaction**

(Navigation systems, Interaction Usability,

Simulation/Manipulation environments..)

• **Exercises**

(Customizable, Exportable/printable results,

Drill&practice, fill-in-the-blank, multiple choice…)

• **Individual/social production**

(Digital writing/content creation tools,

Exportable output,

Registration/play facilities..)

• **Additional components**

(Edutainment-oriented,

videogames, immersive worlds..)

TECHNICAL REQUIREMENTS

- • **Multiplatform**
- • **Multidevice**
- • **Offline use admitted**
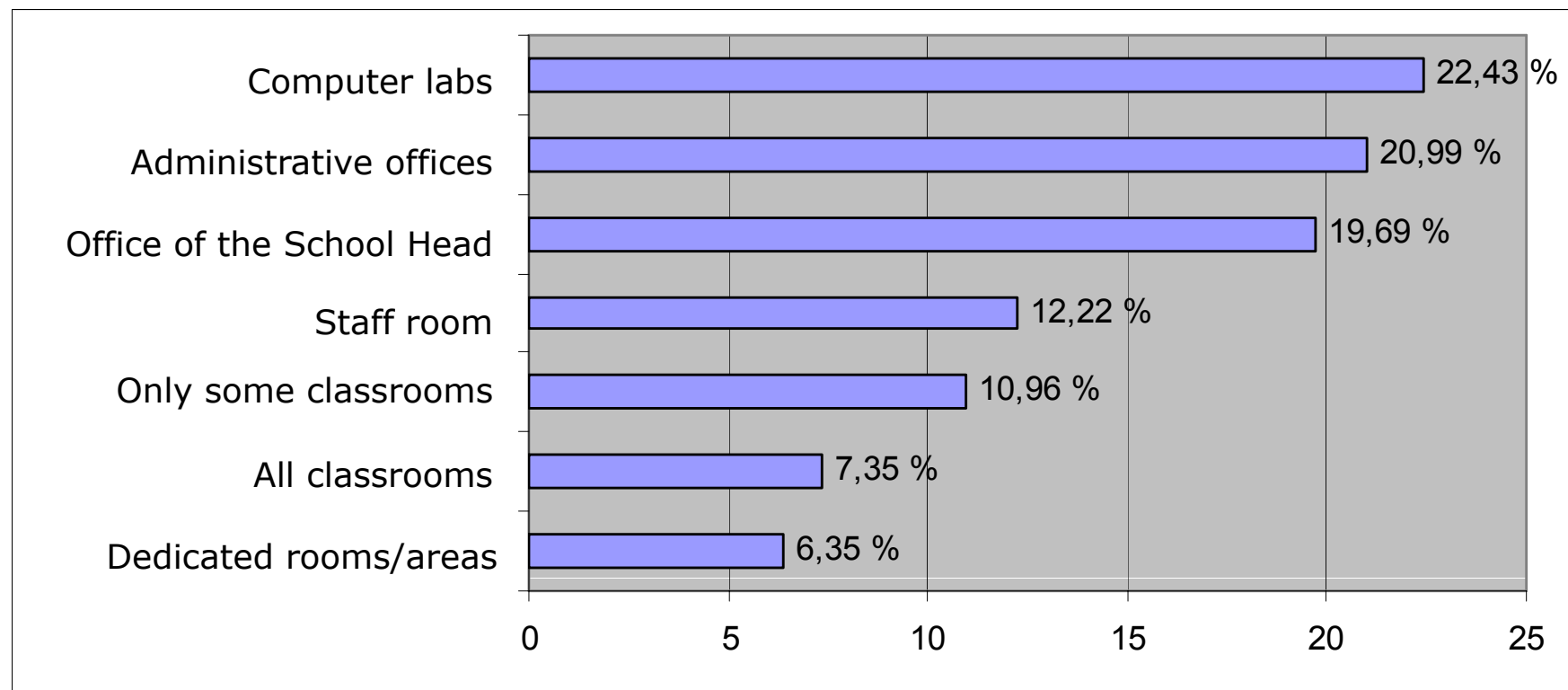- • **Accessibility**
- • **Standards Compliance**

## TECHNOLOGY & PEDAGOGICAL PRINCIPLES

Annex 1/B of Decree n. 41/2009

LEGAL CRITERIA

Annex 1/B of Decree n. 41/2009

More than 85% of schools have broadband but...where is it?

Location	Percentage
Computer labs	22,43 %
Administrative offices	20,99 %
Office of the School Head	19,69 %
Staff room	12,22 %
Only some classrooms	10,96 %
All classrooms	7,35 %
Dedicated rooms/areas	6,35 %

IWB expansion plan monitoring report, Università cattolica di Milano

Percentage of "over 50" in service teachers
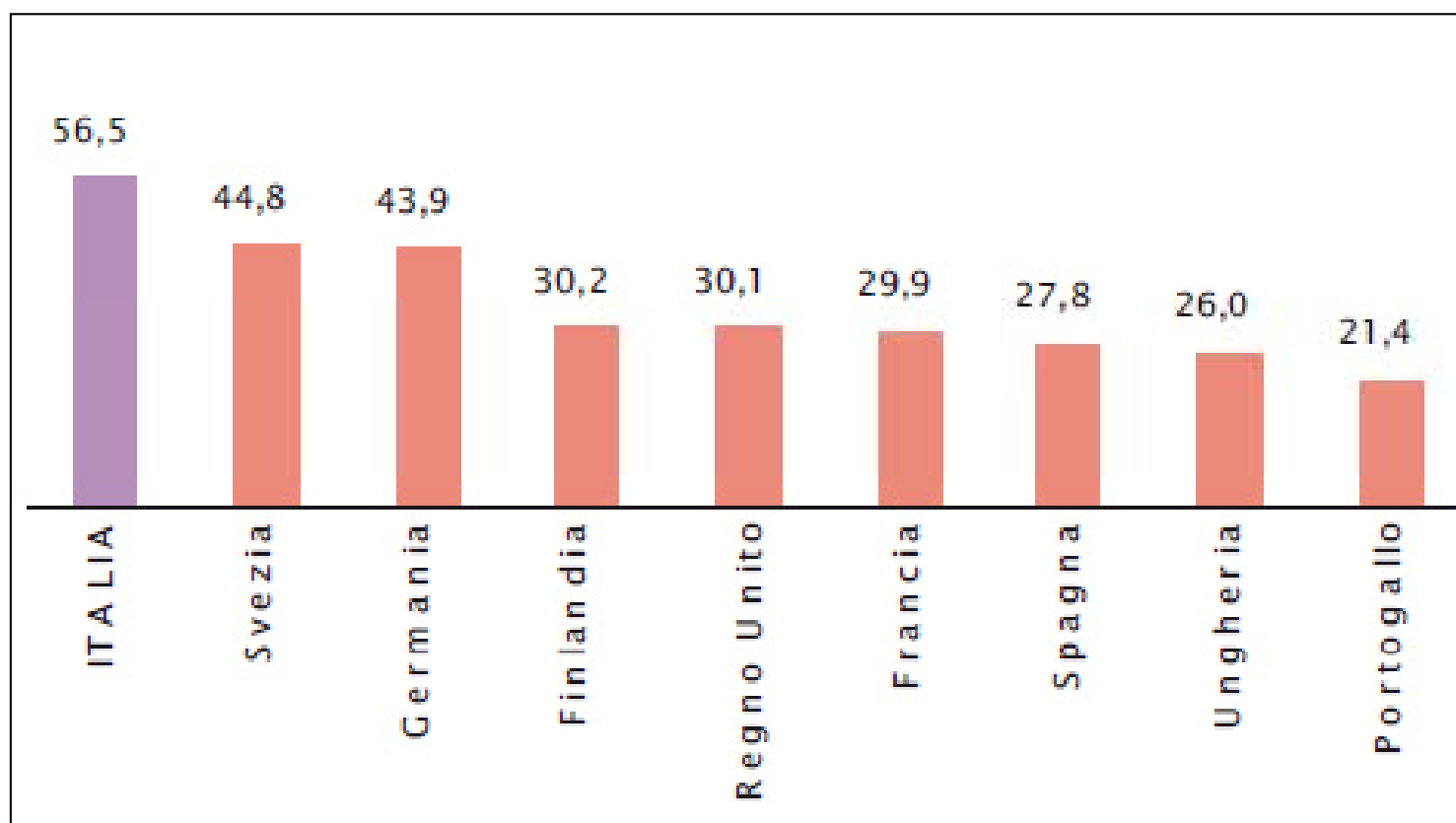
MIUR, OECD

"In our country teaching is based on a strong curricular basis:
the task of teachers is to complete the year program, that very
often is structured by the chapters of the textbook.
Therefore teachers know that the traditional approach
– transmissive and frontal lessons – is the most useful
if they want to reach the intitutional objective estabilished
by the ministry at the end of the year…"

Rapporto sulla scuola in Italia 2010, Fondazione Agnelli, 2010
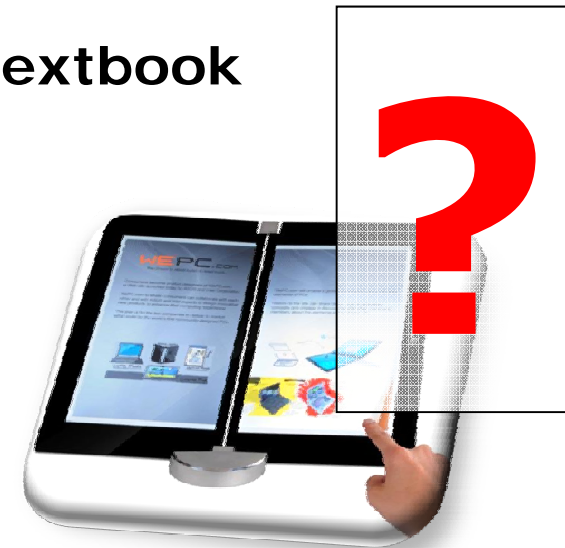
E-book

Hardware: e-reader
Software: reading interface
Content: e-text

E-Textbook

?

Currently, most electronic books and journals are essentially copies of printed versions that can be read on a computer or mobile device.

PDF

Format optimized for paper print?

How students misconceptions
are generated in school education
(textbook presentation)

Why does it happen that sometime only a part of the moon is visible?
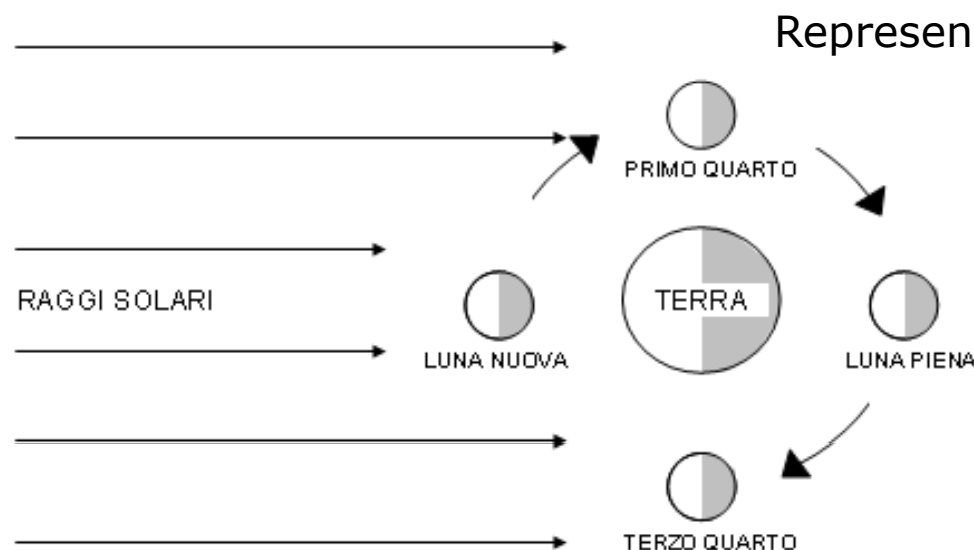*[What happens during the moon phases?]*

Moon phases ≠ Lunar eclipse

50% of students giving the wrong answer (Engeström, 1984)

80% of adults giving the wrong answer (Wagenshein, 1977)

How students misconceptions are generated in school education
(textbook presentation)

Representation in the textbook

PRIMO QUARTO

RAGGI SOLARI

TERRA

LUNA NUOVA   LUNA PIENA

TERZO QUARTO

Real scale sizes and distances:

Sun = 50 cm radius
Earth = 0,5 cm radius
Moon = 1,75 mm radius

Sun-Earth distance = 150 m
Earth-moon = 40 cm

1) Simplified diagrams (sizes and distances unscaled in order to represent Sun, moon, earth and distances together in one single textbook paper page)

2) Bidimensional representation of the phenomenon

   Students were not able to understand the real phenomenon and how difficult it is that the shadow of the earth could obscure the moon

Advantages:

Less paper consuming
Lower price
Portability
Loss of weight
Capability

Text based features:

- Note-taking
- Highlighting
- Bookmarking
- Quick search and finding
- Instant translation
- Contextual dictionary
- Audio text reading
- Copy&paste

Innovative learning?

	Traditional (instruction)	Extended (knowledge construction)
Activity	Teacher-centered and didactic	Learner-centered and interactive
Teacher role	Fact teller and expert	Collaborator and sometimes learner
Student role	Listener and learner	Collaborator and sometimes expert
Learning emphasis	Facts and replication	Relationships and inquiry
Concept of knowledge	Accumulation	Transformation
Demonstration of success	Quantity	Quality
Assessment	Norm-referenced and multiple guess	Criterion-referenced and performance portfolios
Technology use	Seat work	Communication, collaboration, information access, and expression

Report on 10 Years of ACOT Research, 1995

Learning $\neq$ Reading

Mayer bases his *cognitive theory of multimedia learning* on the following model.
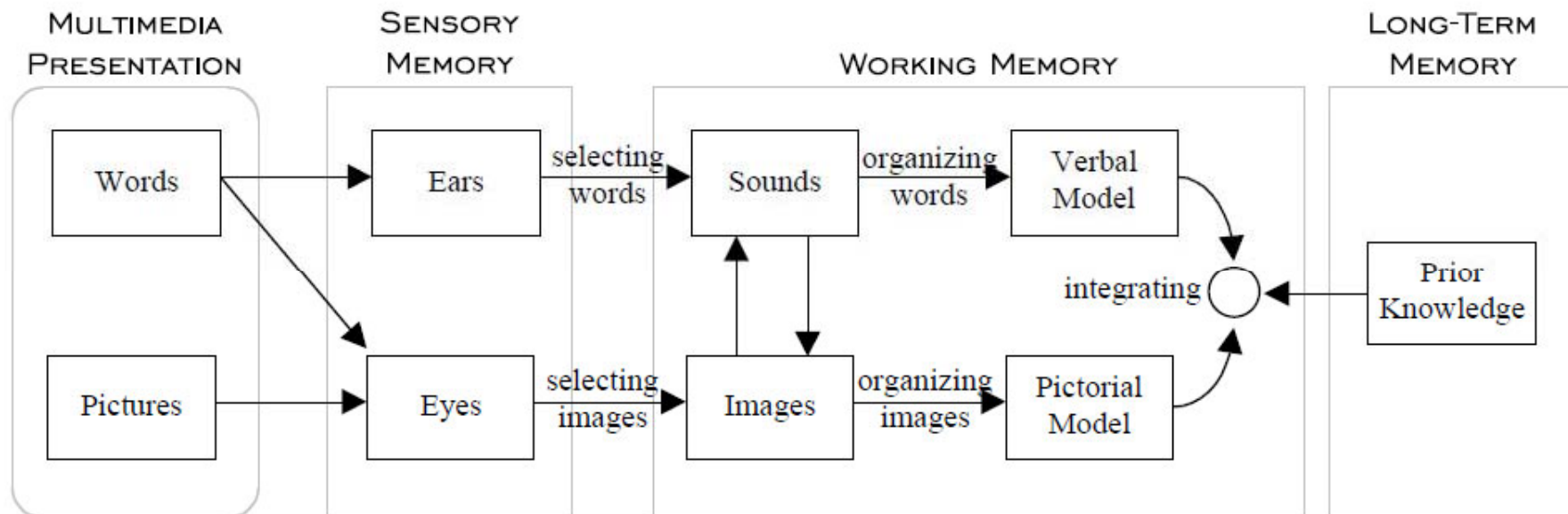
What kind of textbook do we want?

Advanced text based features on a technology that enables comfortable reading

+

High quality multimedia digital content that enables effective learning

Digital text	Enriched media content
Analytical study	Discovery/ Manipulation
Text	Enriched media
Individual reflection	Interaction/ sharing

LOOK

BROWSE
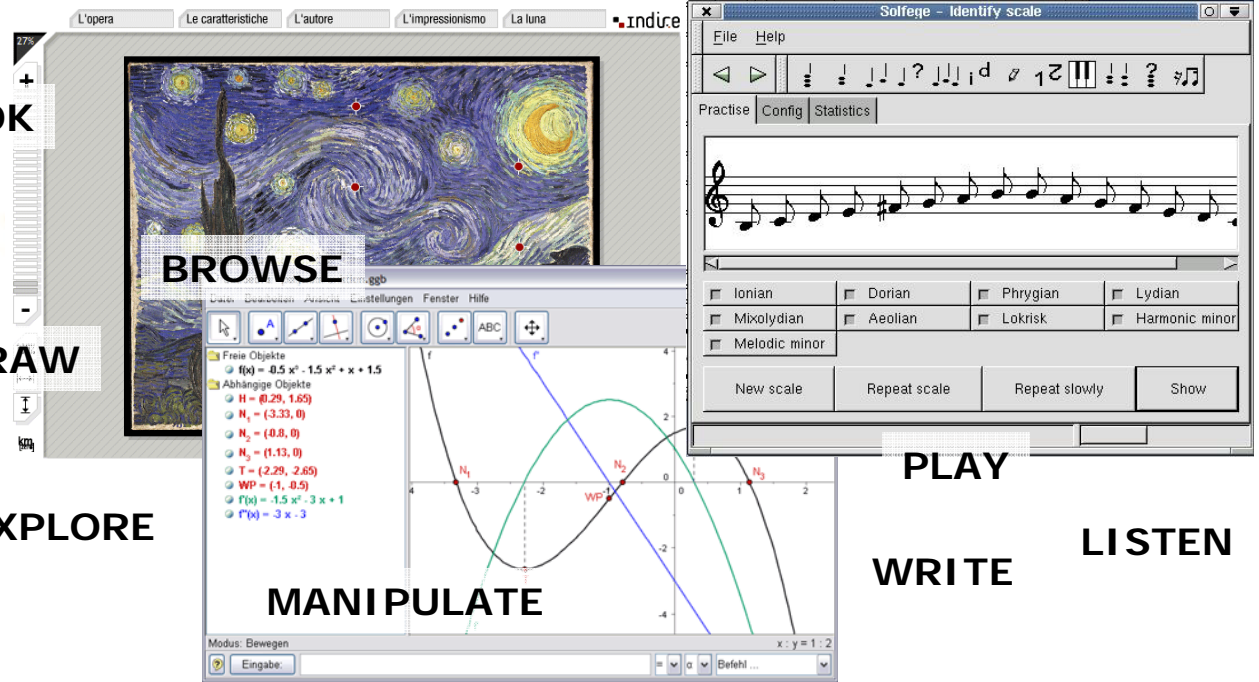
DRAW

EXPLORE

PLAY

LISTEN

WRITE

MANIPULATE

READ

INTERACT

E-INK

LCD

ePUB3

Interoperability on devices
with different capability and size

- Woldwide language support
- Native multimedia (Video/audio formats)
- Interactivity (E-learning quizzes, Gaming, Content transformation, Personalization)
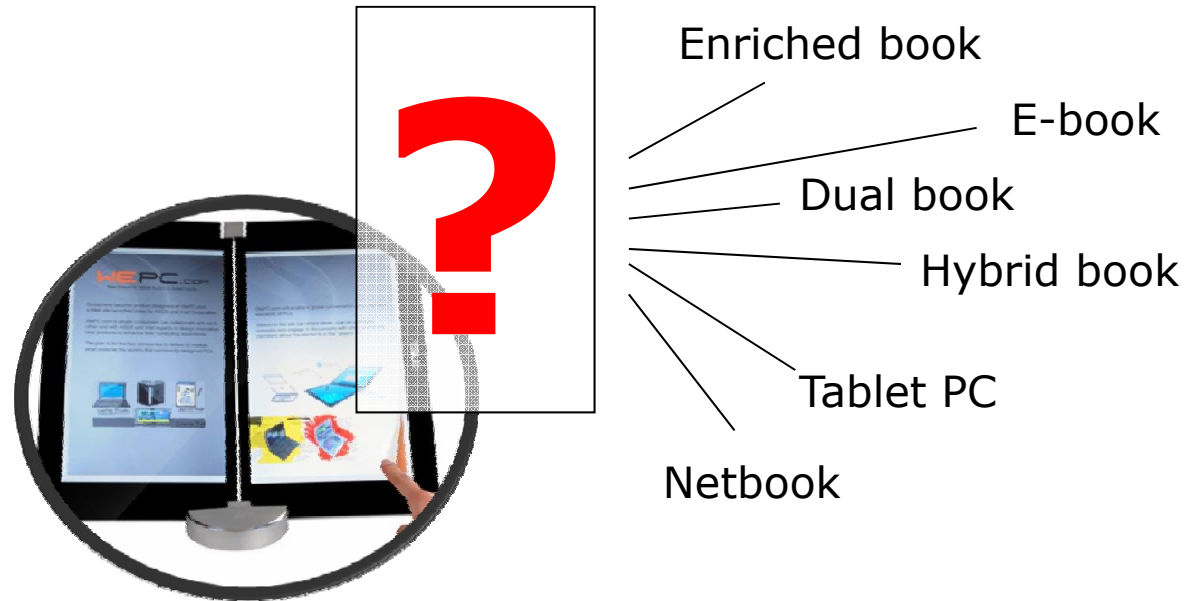- Advanced layout (Alternate stylesheets based on screen size)

Lean forward
(create content)

Lean back
(consume media)

New devices that solve the problem of media convergence.
"We are just as happy to do email and web surf
as we are to lean back and watch a video or a movie."

E-Textbook

Enriched book

E-book

Dual book

Hybrid book

Tablet PC

Netbook

- Device (convergence = lean forward + lean back)
- Interoperable and adaptable standard
- Content: e-text + rich media enhancements

Support effective learning enabling a personal learning ecosystem for each student

The most interesting aspect of electronic books, however, is not
the **devices** they are accessed with; it is not even the **texts** themselves.

What makes electronic books a potentially transformative technology is
the new kinds of **reading experiences** that they make possible.

Publishers are beginning to explore richly visual interfaces that
include **multimedia** and **collaborative elements**.

(The Horizon Report, 2011)

Thank you!

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