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Hybrid Book — Universal Access to the Content

Sign Languages in Tertiary Education and Scholarly Publications in Sign Languages

Brno, 16th June 2016

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Aim of Hybrid Book

- to provide universal access to the content for readers with a limited perception of some of the mainstream information channels
  (e.g. the deaf, the blind, dyslexics and others)

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Which way?

- as a document providing content in several types of media – **synchronized**

  → **Hybrid Book**

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What is Hybrid Book

- digital publication format
- couple of applications to read and to author

- at Masaryk University used for providing some of the accessible educational materials

- **www.teiresias.muni.cz/hybridbook**

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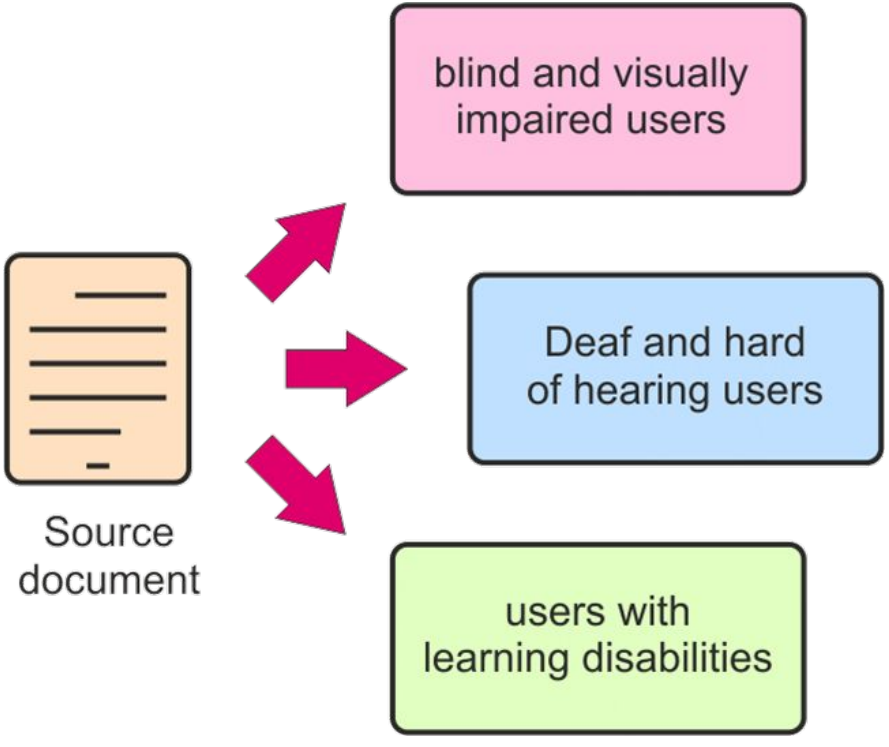
What is Hybrid Book

- content presentation with complementing records which enable:
  - perceiving visual text *visually*
  - perceiving in sign languages *visually*
  - perceiving text in Braille *tactilely*
  - perceiving content via audio narration *audibly*
  - quick and easy navigation in the structure

Primary target groups



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History of Hybrid Book

- the idea is not new – procedures and approach of the latest Hybrid Book is new or innovated

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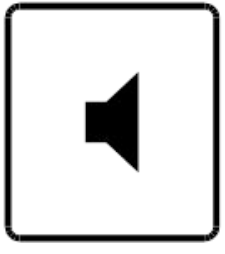
History of Hybrid Book

- **version 1** (2000)
  - multimedia publication combining an electronic **text** with **audio** (made by human voice) supplemented by complex navigation apparatus
  - to be read on computer, Hybrid Book Player as a native application, distributed on CD
- **version 2** (2006)
  - reader application migrated to **web app online**
  - based on HTML, JavaScript, Windows Media Player/QuickTime, optimized for MSIE, Firefox

Structure and features

- **types of media**
  - text
  - audio (mainly for spoken audio narration)
  - video (mainly for sign language translations)


Structure and features

- all medias **synchronized**, played at the same time or alternately
- **more sources** of the same media type
  → more languages in one document
- **more complex objects** incorporated (tabelar data, structured alternate form of graphics, mathematics expressions, footnotes)
- quick and easy **navigation**

Structure and features — Layers

- **Main layer**
  contains the main document (text, audio, video)

- **Additional layer**
  contains extensional content to supplement insufficient information (can be hidden/shown, if shown it acts as a part of main layer)

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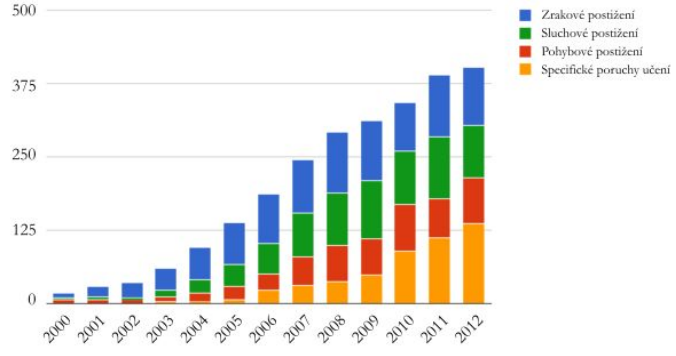
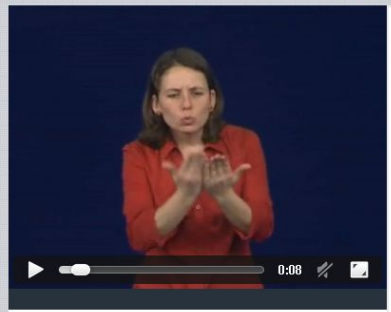
Structure and features — Layers

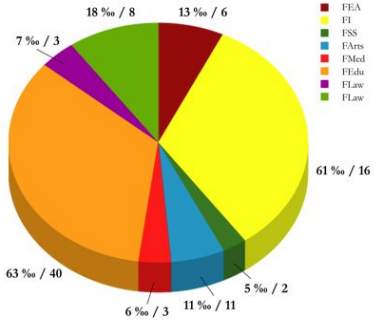


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Visual impairment	9	19	25	38	54	71	84	90	104	101	83	106	100
Hearing impairment	3	5	4	11	23	37	52	76	90	100	91	106	89
Mobility impairment	6	6	6	8	14	23	28	48	61	62	79	66	77
Specific Learning Disorder	0	0	0	3	4	7	22	31	38	48	90	112	137
MU in total	18	30	35	60	95	138	186	245	293	311	343	390	403



II 5. Statistics at Masaryk University

Based on the fact that there are currently 45,000 students and 4,500 employees at Masaryk University, one would expect to find 45 students and 4.5 employees who are functionally deaf (i.e. 0.0001 %), which roughly corresponds to reality. The estimated number of students with a severe hearing impairment (including the hard of hearing) is about 200, although only around half of them (99) have requested practical assistance. Actual figures are displayed in the graph below.



Faculty	Number of all students	Number of deaf students	Relative value (per mille)
FEA	4615	6	13
FI	2637	16	61
FSS	4168	2	5
FSport	1563	0	0

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Reading a book

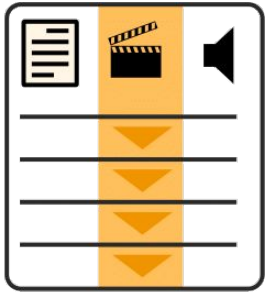
- web application online

- full media synchronization
- complex navigation (by sync units, headings and by using outline view)
- highlighting of the passage being currently read (in the text)

Reading a book

following a continuously moving synchronized content

playback of individual passages



following a selected recording only

Reading a book

- muting on/off audio playback, switching among audio medias
- showing on/off video, switching among video medias
- repositioning elements of UI
- alternate content (layers) processing

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Format Specifications

Data structure

- multimedia information (types of present media)
- electronic text data
- media sources
- media tracks
- outline data
- sources ↔ tracks relations
- „imprint“ data

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Format Specifications

Format of media

- Text: XHTML
- Video: MPEG-4 (H.264), OGG (Theora codec)
- Audio: MPEG-1 Layer 3 (“MP3”), OGG (Vorbis codec)

(Multimedia tracks must be duplicated to be compliant to HTML5 standards.)

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Format Specifications

Synchronization

- synchronization data of our own – XML
- based on dividing content to synchronization units – the smallest building blocks (certain logically delimited passages)
- storage of synchronization data is independent on storage of document/media data

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Challenges in synchronizing medias

- challenges in sign language how to present forms typical for written text
- challenges of synchronization of so different media and languages

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Future prospects

- player applications for other platforms
- offline reading
- improve reliability of sync with virtual cursor of screen-readers
- improve additional layers which provides alternate content of complex objects
- implement “native” navigation in tabular structures
- implement math expressions

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Thank you for your attention.

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