FLEX PICTURE EBOOK

A digital book for inclusive learning

Summary 2nd series questionnaire

Work Package	3: Field tests (children & accompanying adults)
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Content

www.flexpictureebook.eu

Instagram: flex_picture_ebook

Facebook : Flex Picture Ebook

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Introduction

A field survey was carried out in France, Italy and Lithuania in Spring 2024. A total of 246 children and 48 teachers, parents and educators were accompanied by the project partners as they discovered the book *Ben Wants a Bat*. The aim was to gather information on the uses and needs of children and caregivers, and to use this feedback to improve the EPUB3 Flex Picture Ebook. The accompanying adults were given a teaching guide to help them make the most of the many possibilities offered by this digital book.

At the end of the reading session, the children and their caregivers answered a questionnaire containing 48 and 42 questions respectively.

Depending on the equipment at the school or in the family, the digital book was read by the child on an Android tablet with the *Reasily* reading application, on an iPad with the *Book* reading application or on a computer with the *Thorium* reading application.

This document is a summary of the results collected.

Children's responses:

1. *Children with visual impairment (41 children)*

Demographic characteristics :

- **Types of disability**: 93% visually impaired, 7% blind.
  - 34 born visually impaired, 4 late-onset.
  - 3 born blind, 1 late.

Using the features :

- **Adapted illustrations**: 68% use adaptation levels (see images change, remove distracting details).

- **Zoom**: 78%, in particular to see drawings more clearly.
- **Pointing**: 54% to focus on a detail or avoid visual clutter.
- **Background and font** :
    - Colour modified by 46% (often black for visual comfort).
    - Adjusted font size for 29%, often for legibility.
- **Sound animations**: 95% find them fun and useful.

Aids to understanding :

- Sound/entertainment: 80%.
- Narration: 75%.
- Zoom: 48%.
  Highlighting details: 41%.

2. Children with no special needs (118 children)

Demographic characteristics :

- Mostly from France and Lithuania (no Italian participants in this group).

Using the features :

- **Adapted illustrations**: 63%, for curiosity or to better understand the images.
- **Zoom**: 45%, often to test or observe details.
- **Score**: 33%, out of curiosity or to get a better look.
- **Background and font** :
    - Colour modified by 78%, with an interest in dark backgrounds.
    - 89% change in font size for improved visibility.

Aids to understanding :

- Sound/animation: 75%.
- Narration: 68%.
- Image adaptation levels: 36%.

3. Children with other special needs (87 children)

Demographic characteristics :

- Diversity of profiles :
    - Mild intellectual disability: 16.
    - Attention deficit disorder (with or without hyperactivity): 6.
    - Sensory disorders (visual/auditory): 5.
    - Other: neurological syndromes, learning a foreign language.

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Using the features :

- **Adapted illustrations**: 51%, to simplify or better understand the images.
- **Zoom**: 45%, ideal for examining emotions or magnifying specific elements.
- **Score**: 37%, sometimes seen as a game or to get a better look.
- **Background and font** :
    - Colour changed by 52%, often towards yellow or preferred tones.
    - Font changed by 61% for improved legibility.

Aids to understanding :

- Sound/entertainment: 66%.
- Narration: 57%.
- Image adaptation levels: 37%.

4. Comparison of groups

- **Adoption of interactive functions**: Children with visual impairments make greater use of adaptive functions (zoom, pointing, colour).
- **Narration preferences**: Reading by an actor is more popular with children with visual impairments and other special needs.
- **Understanding through illustrations**: The levels of adaptation of the images are considered useful by all the groups, but used more by children with visual impairments.

This segmentation shows that the Flex Picture Ebook meets the varied needs of children, with adaptations that are particularly relevant to specific profiles, while remaining attractive to children without disabilities.

Responses from adults/caregivers:

1. General characteristics

- **Participants**: 48 adults (19 in France, 22 in Italy, 7 in Lithuania).
- **Number of children supervised**: 349 children (203 in France, 103 in Italy, 43 in Lithuania).

2. Feedback on the use of Flex Picture Ebook

Perceived usefulness :

- 98% find that books facilitate interaction with children.
- 90% noted the children's enthusiasm for the discovery.
- 100% would like to see more interactive and customisable digital books.

Ease of use :

- 98% find the book easy to use.
- 98% think that children and professionals could quickly learn to use it.

Flex Picture Ebook :

- Promotes educational differentiation :
  - Adapting activities to specific needs.
  - Inclusion and valorisation of children with difficulties.
- Motivation and autonomy :
  - Helps capture attention and develop interest in reading.
  - Allows independent activities while boosting students' self-esteem.
- Enhancing interactivity :
  - Animations, narrated texts and customisable illustrations are seen as innovative teaching tools.

3. Problems encountered

- **Technical** (40% of respondents) :
  - Slowness of certain functions (e.g. audio start-up).
  - Inadequate size and visibility of buttons.
  - Frequent bugs (pages blocked, audio interrupted, settings not saved).
- Ergonomics :
  - Lower-case commands are a problem for children who can't read.
  - The need to double-click to turn pages is seen as unintuitive.
- Suggested improvements :
  - Enlarge the buttons and improve the contrast.
  - Add visual tracking of words/syllables as you read.
  - Enable dynamic adjustments during playback.

4. Educational and practical use

Individuals:

- Adaptation to specific needs: simplification of images, font selection, fatigue management.
- Skills development: reading, comprehension, vocabulary enrichment.
- Promotes independence: structured, personalised activities.

In groups (whole class or small groups) :

- Inclusion: the book can be used to create a climate of inclusion in the classroom.

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- Sharing: children can interact around shared content, while adapting the settings individually.
- Collective motivation: interactivity captures attention, even in a context of collective reading (e.g. interactive whiteboard).

5. *Suggestions for enhancing the experience*

Additional content :

- Comprehension questions at the end of the reading.
- Interactive activities to learn more about the text (vocabulary, links with images).
- Book series with recurring characters to keep children interested.

Technical improvements :

- Visual tracking of words during audio playback (dynamic colouring).
- Children can record their own voice to read the text.
- More options for customising sound and visual animations.

6. *Usefulness of specific functions*

Popular parameters (Thorium and Flex Picture Ebook) :

- Font type: 96%.
- Font size: 94%.
- Background colour: 88%.
- Illustration adaptation levels: 98%.
- Black and white/colour: 90%.

Helpful support :

- The mediation guide is considered clear by 75%.
- 52% use additional tactile media (e.g. volume objects).
- Ideas for scenarios and activities to include all students (60%).

7. *Conclusion*

Flex Picture Ebook (FPE) benefits :

- Teachers love the animations, narration, illustrations and customisation options (fonts, backgrounds).
- The FPE allows for **personalised reading**, adapted to the specific difficulties of pupils.
- Children become **active participants in their own learning**, with opportunities for autonomy and remediation.

Use in educational practice: The FPE encourages...

1. A taste for reading.
2. Independent activities.
3. Developing **reading skills**.
4. **Differentiated teaching**, adapted to specific needs.
5. **Inclusion** and valorisation of students with difficulties.
6. **Sharing and interaction** within the class.

The conscious use of the tablet and the FPE improves the **self-esteem** of pupils in difficulty and enriches their reading experience in innovative ways.

Suggested improvements :

Teachers would like :

- Add **questions with pictures** at the end of the reading.
- Introduce **visual tracking of words/syllables** during audio playback.
- Suggest **lexical** activities (associating images, writing and sounds).
- Record the **student's voice** for personalised listening.
- Include comprehension questions and more interactive activities.

The support staff recognise the **educational and inclusive potential** of the Flex Picture Ebook, particularly for pupils with learning difficulties. However, they highlighted **areas for improvement** in terms of ergonomics, technical bugs and the enrichment of educational activities. Overall, the project is seen as a significant step forward in the use of digital tools for reading.

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Resources available

A number of resources have been made available to help you understand the story and explore it even further.
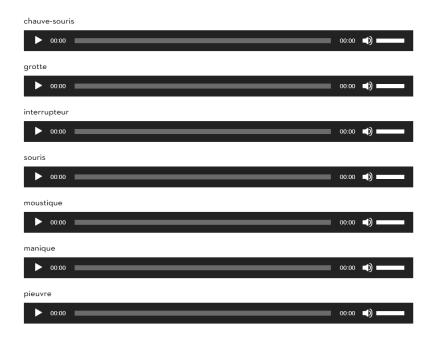
1. Iconographic sheet

A file containing several graphic elements referring to *Ben Wants a Bat*

2. Sound

The sound of the animations in the EPUB.

chauve-souris

grotte

interrupteur

souris

moustique

manique

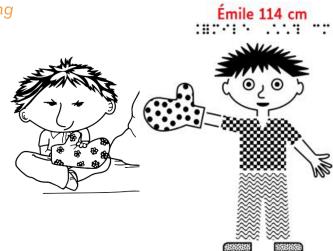pieuvre

3. Classic and adapted colouring

Classic colouring pages are designed for children with no visual impairment, while adapted colouring pages are for severely visually impaired children and can be used in 2 ways: printing with classic ink or printing with a PIAF oven to inflate the ink. In the latter case, the tactile outlines will help children to locate the areas to be coloured

Émile 114 cm

4. Alternative text to images

During the development of the digital book, an alternative text was included for each image so that blind readers could also access the content of the images. Each alternative text is read by a computer-generated voice using assistive software.

5. Relief drawings (in the PIAF oven)

We have designed relief drawings (relief ink, thermogonflage, or PIAF oven) using the highest level of illustration simplification (level 5). Beforehand, you produced a selection of the illustrations needed for understanding (the main characters, respecting the notion of scale between them, and a few plates of illustrations from the book, enabling blind and partially sighted children to share the same illustrations from the book. Blind children thus had access to the same illustrations as the others, enabling collaborative use.

Appendix 1: Project summary

Flex Picture Ebook: a digital book for inclusive learning

Existing teaching materials often do not meet the specific needs of children with disabilities. What's more, adapted books are often expensive and pose problems when it comes to integrating them into inclusive educational environments.

In partnership with digital accessibility experts, teachers and a children's book publisher, this project aims to design an illustrated digital book that is accessible to all children, including those with disabilities. In addition to the text to be configured, a 'Flex Picture Ebook' includes adapted illustrations with several levels of simplification, interactive elements and an audio narration, while remaining affordable. A quick demonstration of how to set up the Simplify Isolate Animate Zoom illustrations can be found on the project website.

Our aim is to increase the availability and quality of accessible digital books that fit seamlessly into inclusive learning environments.

Key deliverables:

- Flex Picture Ebook 'Émile veut une chauve-souris' (V Cuvellier, R. Badel) in 5 languages.
- Raising awareness and providing support for teachers and parents by supplying teaching scenarios tested in the classroom.
- Training content producers in the publication of Flex Picture Ebooks and making available free software and guidelines.

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Appendix 2: European partners

France

Les Doigts Qui Rêvent, Talant

Ludosens, Bègles

Institute for the Young Blind (IJA), Toulouse

Austria

Johannes Kepler University, Linz

Italy

Fondazione Robert Hollman,

AbilNova, Trento

Lithuania

Lietuvos **Aklųjų** ir **Silpnaregių** Ugdymo Centras (LASUC), Vilnius