Emőke Varga – Gabriella Daróczi

# The Role of Interactive Books
## in the Development of Reading and Reading Comprehension

A case study on the implementation of the interactive books of the BOOKR Suli software in the classroom


ELTE Eötvös Kiadó

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ELTE EÖTVÖS KIADÓ

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*Reviewed by*
DR. HABIL. LEHMANN MIKLÓS
WITTMANN ILDIKÓ

*Translated by*
DR. ÉVA KOVÁCS

*Cover by*
GELLÉRT MAGONY
Using an illustration by Krisztina Maros

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# FOREWORD

In recent years, there has been interesting research, exciting debates, and dialogues around the world about interactive books and their potential applications. Probably, the deepest root of this is to be found in the fact that the interactive book as a new medium is not yet an 'established' medium but is still in search of its place. There is no value judgement here, and this does not reflect badly on interactive books; on the contrary, the cultural (and cultural mediation) role of this new kind of book is being shaped in a positive way, as it is the case with all new media and cultural and technological innovations after their emergence. And since interactive books are a proliferating component of a rapidly changing digital environment that is in a state of flux (much of the digital environment is, in Tim O'Really's words, "in constant beta"), their scope is not fixed. But we can also look at the issue from the user's perspective: for them, the potential of interactive books is a field to be explored as they try to integrate the tools and applications into their daily activities as both readers and users.

This alone would be sufficient proof of the timeliness and justification of Emőke Varga and Gabriella Daróczi's book. It is worth adding, however, that the authors have also carried out an extensive study (a case study) during the research on which the volume is based, the like of which has not been carried out in Hungary before. The authors' conclusions are therefore supported by empirical data and direct experience from a well-documented case study.

International literature has been analyzing the characteristics of interactive books since around 2010. By this time, advanced digital tools had made it possible to offer readers a reading experience and information acquisition strategy different from traditional books by introducing multiple visual representations. Research has also shown that reading differently from print books activates different neural processing pathways and different cortical areas – i.e. different cognitive processes than those previously involved in reading – when using an interactive book. The international literature also describes research that has investigated the functionality of interactive books. These results are known to the authors themselves, who appear to have used them in the design of their research. However, their interest focused on a specific area, the pedagogical usability of interactive books for 7–12-year-olds.

Mapping a relatively new field of research is not a straightforward process: not only must the research itself be planned, but its categorization, the standards, the delimitation of the parameters, and the need to ensure that they are introduced into the research in a rigorous and consistent way, rather than in a haphazard way. In this work, the authors were able to draw in many respects on the international literature on the subject and on reading research, but they had to create the parameters for the case study independently. The aim of the case study was to compare the ability of interactive books to develop children's language awareness and reading comprehension skills in a more versatile way than print books, and to demonstrate how these books and related activities can be implemented in the classroom in a practical way. The novelty of the research lies primarily in the latter: in Hungary, no previous studies have been carried out in this area, and interactive books are often viewed with a rather distrustful suspicion in Hungarian schools (for this reason alone, it is therefore important to achieve a positive impact in this direction through objective and convincing studies).

Here we have another constraint to consider. The research presented in this volume does not deal with interactive textbooks in general (they are certainly easier to accept, since the activities embedded in their texts are a well-justified way of helping to learn a particular subject), but with the processing of fairy tales and works of fiction. Consequently, interactivity is used more for the acquisition of skills than for the teaching of a subject. This also means that, to carry out their research, the authors also had to develop the details of the activities involved in the reading and comprehension practice in such a way as to measure the impact of interactive books in these processes. It was therefore appropriate to develop a test application for the case study and an administration interface for data collection (provided by the developers of the interactive book, based on existing applications).

Schools and teachers were involved in the research on a voluntary basis. Although the resulting sample does not cover the whole country and is not representative, for example, in terms of regions or types of localities, it provides sufficient data to draw the most important conclusions. The authors' methodological thoroughness is also demonstrated by the fact that they prepared sample storybook designs for the three different interactive storybooks used in the data collection and, in the first phase of the research, trained teachers in the use of the interfaces and the techniques of using the interactive books in the classroom.

The way the data were collected allowed the authors not only to obtain general information about the positive and possibly negative effects of interactive books on the development of literary comprehension, but also to draw conclusions about the development of individual subskills: understanding relational connections, recognizing connections between different kind of media, building the relationship between propositional knowledge and new information, or establishing metacognitive knowledge. The authors convincingly present the different types of tasks, interactive elements and the instruments used to measure their impact, basing their conclusions on a sufficiently large database.

The overall results show that interactive books have a positive impact on the development of reading comprehension in most of the areas covered in this book. This result is significant not only because it is the first study of its kind in Hungary (and because it is very novel in the field of literary text processing on an international level). Hungarian schools are woefully behind in the field of digitalization, even after the introduction of distance learning and forced digital education twice in the past, due to the epidemic situation. This is only partly due to the poor ICT equipment in schools, the obsolescence of the equipment or the weakness of the internet connection. Equally important is the lack of a pedagogical approach and the fact that systemic change is extremely slow, making it almost impossible to adapt to rapid social and cultural transformations. However, education cannot ignore the new tools used in socio-cultural life but must be sensitive to them and introduce technological innovations one by one.

The authors quite rightly recognize that a new tool, the interactive book running on mobile IT devices, requires the introduction of a new methodology in education. The interactive book does not simply replace printed books but offers a new kind of information tool alongside them, with a complexity of modalities and an appreciation of visual information. Most of the fear of interactive books has been generated by a poorly founded belief that they will make print books disappear, and – consequently – the book-based literacy.

And there is another thorny issue linked to this. The authors conclude that interactive books offer a good tool for literacy education and can therefore help to solve one of the most important problems in contemporary pedagogy. However, it is often the interactive nature of digital devices that is seen as a flaw: fast-moving, colourful interactive interfaces turn children away from books, making them seem boring and uninviting. But in this respect, books and interactive books are hardly comparable – each makes readers read in a different way. For a child becomes a reader only when he or she is able to develop a kind of intimate relationship with the text, when the book is able to bring the narrative of the reading alive for him or her. It is easy to see that the mechanism of action of a printed book and an interactive book is (at least partly) different in this process. In the case of printed books, the longer attention span focused on the narrative provides the immersion, during which the same areas of the cortex are activated as in the real-life experience of events. According to the authors, "The immersion in an interactive book encounter, on the other hand, is based on a kind of kinesthetic connection, one pole of which is embedded in the immediate, concrete, even tangible sensory experience of the 'here and now'" (p. 15) - this implies activation of the sensorimotor cortex, as well as areas involved in spatial orientation and problem solving. Thus, well-constructed interactions involve more extensive ways of processing the text to enable the child to develop an intimate relationship with the text, and thus the interactive book "is also a way of preserving and extending the tradition of reading and listening to stories, which is at its core a deep, meaningful reading and a sensitive experience of the story" (p. 18.). In line with this, the research presented in this volume is aimed at the age group most affected by reading literacy: pupils in the first six years of school.

However, the quotes also indicate how important it is that the text and the interactions form a single unit. For each interactive element, it is worth asking whether its inclusion is justified, whether it adds anything to the interpretation of the text, whether it helps children to process the text, to read it for meaning. Only the affirmative answers to these questions make an interaction a functionally appropriate element in the text. The three interactive books used in the research (discreetly animated, with limited interactivity and no distractions) meet the requirements. It cannot be ruled out that the aversion to interactive books among teachers is the result of encountering books of lower quality than these. If an interactive book is closer to a video game than to a printed book, it is difficult to integrate it into the pedagogy of reading comprehension: its interactions hinder rather than help the processing of the text and constitute a barrier to meaningful reading and immersion.

It is worth mentioning here that the authors have already created sample lesson plans around the interactive book in the preparatory phase of the research. These offer a good example for all practicing teachers to build their own lessons according to a new methodology – and can of course be integrated into teacher training. It is useful that they have been included in this volume, as there is currently a lack of widespread and thorough dissemination of good practice in this area.

It is also important to highlight the role of differentiation (which, fortunately, is also currently receiving a great deal of attention in almost all areas of pedagogy) and to show how the interactive book can support this effort. To demonstrate that this cannot be emphasized enough, it is sufficient to refer to the sad fact that Hungarian education is currently unable to compensate for and reduce the disadvantages of children's family environment; rather, it tends to preserve

and increase them. Appropriate differentiation can go a long way towards improving this situation, making it possible to overcome cultural disadvantages and to change children's long-term life prospects in a positive direction in every sense.

In connection with the latter two problems, it is worth mentioning that it would be useful to have some studies or articles to disseminate the results of the research and the methodological elements described, which could also be made more widely known to teachers. But it would also be very useful if the results presented here could help to dispel some misconceptions. The authors of the book make some reference to this, but in addition to the immediate aims of the research, it is now worth highlighting the importance of interactive books as a tool for developing and building digital literacy. It can make an important contribution to ensuring that the changing ways of reading and seeking information in the digital environment are also central to school education.

Emőke Varga and Gabriella Daróczi's book is thus structured around exciting questions that are crucial for the current school-age generation. In the broader context of the research, the question is: how can school education be designed to provide children growing up in a digital environment with modern lessons, activities and experiences that are closely linked to everyday life, positively shape skills and abilities, and effectively transfer knowledge? What we read in this book is obviously only a small part of this – but a very important part.

*Dr. habil. Miklós Lehmann*

# INTRODUCTION

## Orientation

The publication discusses the classroom implementation of an increasingly popular and critically acclaimed new online platform which has been included in several countries' public and higher education: interactive books. A 2019-2020 study conducted in Hungary within the framework of an agreement between the Klebelsberg Centre of the Ministry of Human Capacities and Móra-BOOKR Kids Kft., the largest Central European company that produces interactive books, has shown that interactive books accessible on tablets and smartphones provide a revolutionary opportunity to develop the reading comprehension skills of younger generations, maintain their interest in literature and cultivate a culture and habit of digital reading in them. The goal of this publication is to provide data and summarize the results of this study and its associated project and highlight the advantages of using BOOKR Suli software in public education, primarily in teaching Hungarian language and literature to students aged 7–12 years.

The project was implemented in more than 30 public education institutions in Hungary, with the participation of almost half a hundred teachers and more than 2,000 students. Its aim was, on the one hand, to make the potential target audience of interactive books (students aged 7–12) and mediators (lower grade primary school teachers and teachers of Hungarian language and literature) familiar with interactive books in a professionally structured way, and, on the other hand, to enable survey subjects to successfully integrate the new opportunities provided by the software for developing digital reading comprehension in the classroom.

The broader educational policy context of these goals was determined by the general guidelines for digital education, which is primarily focused on "deveveloping digital competence and achieving the development goals defined in the Curriculum Framework through the effective use of info-communication technology and disseminating digital pedagogy and promoting its application to ensure that the range of methods are broadened, as a result of which skills and abilities related to digital competence are developed besides the school subject Information science."[1] The implementation of these guidelines into practice was facilitated among others by the *Digital Competence Development* project (2017–2020), which also contributed greatly to this publication in addition to other government-sponsored programs such as *Digital Theme Week* and *Digital Education Exhibition and Conference*, etc. Another aim was to facilitate students' digital competence and renew "teachers' practice of using ICT tools in and out of class."[2] The issues raised in this publication were fundamentally determined by these two aspects as well as the main directions of international research outlined below.

[1] Digitális Témahét. [Digital Theme Week]. – In.: Website of the Centre for Digital Pedagogy and Methodology, Digital Success Nonprofit Ltd. https://digitalistemahet.hu/ (Accessed 24.01.2024.)
[2] Digitális kompetencia fejlesztése. [Development of Digital Competence]. EFOP-3.2.4-16-2016-00001 – In.: Website of the Klebelsberg Centre, https://kk.gov.hu/digitalis-kompetencia-fejlesztese (Accessed 24.01.2024.)

## The contexts of interactive book research

### International research

Researchers have been examining issues related to the use of digital technologies in the classroom for decades. How do teachers use IT tools, what software do they prefer, what socio-economic-infrastructural factors can and should be examined in relation to the use of technology, in terms of what socio-economic, infrastructural factors can the use of digital technology be examined and is it worth examining and what skills do multimedia tools develop, etc.? During the "digital revolution" and due to the paradigm shift brought by the increasing role of digital education around the world (2020–2021), it seems increasingly justified to put these questions in a new perspective and seek new answers to them[3]. Among other things, it seems justified to give a more detailed examination of the educational potentials associated with a given tool or application type, including interactive books, which revolutioned the history of picture books. Although they appeared only a decade ago, they placed educational research questions on a new platform.

Since the beginning of 2010, researchers, teachers and educators at various universities and international projects around the world have been conducting representative or empirical case study research on the pedagogical effectiveness of interactive books as software suitable for digital transmission of works of (children's) literature in educational settings. In recent years, international[4] and Hungarian projects have focused not only on studying the use of the apps at

[3] Kevin, Lisa – Verenikina, Irina – Jones, Pauline – Beath, Olivia: Investigating synergies between literacy, technology and classroom practice. – In.: Australian Journal of Language and Literacy. 36. 2013. (3) p. 135–147 http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1405&context=sspapers (Accessed 24.01.2024.)

[4] Jayemanne, Darshana - Nansen, Bjor: Baby gamers? Theorizing the 'Haptic Habitus' of Very Young Children, Parents and Touchscreen Technologies. DiGRA/FDG '16 - Abstract Proceedings of the First International Joint Conference of DiGRA and FDG Dundee, Scotland: Digital Games Research Association and Society for the Advancement of the Science of Digital Games. 13. 2016. 2. August
http://www.digra.org/wp-content/uploads/digital-library/paper_92.pdf (Accessed 24.01.2024.)
Smeets, Daisy J. H. – Bus, Adriana: The interactive animated e-book as a word learning device for kindergartners. – In.: Applied Psycholinguistics. 36. 2015. 4. p. 899–920.
https://www.researchgate.net/publication/271898547_The_interactive_animated_e-book_as_a_word_learning_device_for_kindergartners (Accessed 24.01.2024.)
Exploring Play and Creativity in Pre-Schoolers' Use of Apps: Report for Early Years Practitioners. http://www.techandplay.org/reports/TAP_Early_Years_Report.pdf (Accessed 24.01.2024.)
Estefani, Thales – Queiroz, João: Children's Picturebook Goes Digital: Implications on Cognition. – In.: Matlit 6. 2. 2018. p. 115–127.
https://www.academia.edu/37300129/Childrens_Picturebook_Goes_Digital_Implications_on_Cognition_2018 (Accessed 24.01.2024.)
Takacs, Zsofia K. – Elise K. Swart – Adriana G. Bus: "Benefits and Pitfalls of Multimedia and Interactive Features in Technology-Enhanced Storybooks: A Meta-Analysis." – In.: Review of Educational Research. 85. 2015. 4. p. 698-739. Cites: Estefani, Thales – Queiroz, João, 2018.
Takacs, Zsofia K. – Bus, Adriana G.: Benefits of Motion in Animated Storybooks for Children's Visual Attention and Story Comprehension. An Eye-Tracking Study. – In.: Frontiers in Psychology. 7. 2016. October 1–12. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5062825/ (Accessed 24.01.2024.)
Guernsey, Lisa - Michael H. Levine: "Getting Smarter About e-Books for Children." – In.: Young Children Journal. Vol. 71. No. 2. May, 2016. p. 38-43. Cites: Estefani, Thales – Queiroz, João, 2018.
Korat, Ofra – Segal-Drori, Ora: E-Book and Printed Book Reading in Different Contexts as Emergent Literacy Facilitator. – In.: Early Education and Development. Vol. 27. 2016. 4. p. 532-550. Cites: Sezgín, Elif Yalçintaş – Ulus, Leyla: The Early Literacy at Preschool Education: The Book or the E-Book? – In.: TOJET: The Turkish Online Journal of Educational Technology – October 2017, volume 16 issue 4
https://www.researchgate.net/publication/320551643_The_early_literacy_at_preschool_education_The_book_or_the_E-book (Accessed 24.01.2024.)
Most recently, similar research was conducted at Carnegie Mellon University in Pittsburgh: Eng, Cassondra – Tomasic, Anthony – Thiessen, Erik: Contingent Responsivity in E-books Modeled from Quality Adult-Child

home and in the nursery school that develop reading comprehension skills of children aged two or six, but also on conducting surveys on the use of apps in the classroom.

It is now clear that digital technologies and software platforms also offer new opportunities and provide benefits in the education of children, with new software appearing in more and more institutions. It is also clear that both research on "picture books and teachers will need new perspectives and conceptual frameworks for text analysis and teaching, as well as developing pedagogical approaches that facilitate teaching multimodal texts in the classroom and readers' transactions with texts."[5]

Of the studies conducted in the framework of large-scale investments, it is worth mentioning the Brazilian Government's National Education Development Fund program launched in 2013, in which experts selected books that meet the quality criteria for text and image; they were converted into interactive digital texts by the producers, and the products were delivered to schools by the government. It should be emphasized that, as indicated in the publications, expertise focusing on the development of media organizational criteria based on empirical research and the selection of useful types of interaction for students played an important role in this process.[6]

As far as we know, the goal of larger-scale empirical research, similarly to the project of the Brazilian government has been twofold so far. The main focus was primarily on measuring the competencies and user habits of two-to-six-year-old children, who cannot read yet, or on examining the competencies of students aged 6–10(12) and their teachers that can generally be associated with new technologies. The latter research intended to answer the following main questions: How do teachers' attitudes change in the new technological environment? How can new technology contribute to developing students' content knowledge and skills?[7]

At the same time, implementing interactive books into the teaching and learning process and contextualizing the aspects formulated in our study are also facilitated by surveys including a

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Interactions: Effects on Children's Learning and Attention. – In.: Developmental Psychology. 56. 2019. Dec. 2. p. 285–297.
https://www.researchgate.net/publication/338052626_Contingent_Responsivity_in_E-Books_Modeled_from_Quality_Adult-Child_Interactions_Effects_on_Children's_Learning_and_Attention (Accessed 24.01.2024.).

[5] Serafini, Frank - Kachorsky, Dani -Aguilera, Earl: Picturebooks 2.0: Transmedial Features Across Narrative Platforms. – In.: Journal of Children's Literature. 41. 2015. 2. p. 16–24.
http://frankserafini.com/publications/serafini-pb-20.pdf (Accessed 24.01.2024.)

[6] Teixeira, Deglaucy Jorge – Vieira, Milton Luiz Horn – Gonçalves, Berenice S.: Organização da multimídia em ebook interativo infantil. Multimedia organization of children's interactive ebook. – In.: Sigradi. Vol. 2. 2015. Num. 3. p. 292–299.
https://www.proceedings.blucher.com.br/article-details/organizao-da-multimdia-em-ebook-interativo-infantil-22331 (Accessed 24.01.2024.)

[7] Kevin, Lisa et al., 2013.
King, John – Doggett. Libby – South, Joseph – Mathews Burwell, Sylvia – Smith, Linda K. – Rudisill, Shannon L.: Early Learning and Educational Technology. U. S. Department of Education, Office of Educational Technology, Policy Brief on Early Learning and Use of Technology, Washington, D. C., 2016. October 2016. https://tech.ed.gov/earlylearning/ (Accessed 24.01.2024.)
Marsh, J. – Plowman, L. – Yamada-Rice, D. – Bishop, J. C. – Lahmar, J. – Scott, F. – Davenport, A. – Davis, S. – French, K. – Piras, M. – Thornhill, S. – Robinson, P. – Winter, P.: Exploring play and creativity in pre-schoolers' use of apps: Final project report. TAP: Technology and Play http://www.techandplay.org (Accessed 24.01.2024.)
Lovato, Silvia B. – Waxman, Sandra R.: "Young Children Learning from Touch Screens: Taking a Wider View." – In.: Frontiers in Psychology. 7. July 18. 2016. p. 1-6. Cites: Estefani, Thales – Queiroz, João, 2018.

smaller number of items and a narrower horizon of questions, but providing accurate figures on presenting and creating multimedia stories in a classroom setting.[8] Accordingly, the most frequently recurring and most important questions for our case study, which also serve as a basis of comparison, were as follows: Under what conditions and to what extent do interactive books develop students' letter recognition and word-level reading skills, vocabulary, and to what extent do they contribute to their compreghending a narrative text? What is the relationship between individual characteristics (age, gender, academic achievement and socio-economic circumstances), the medial mode of story transmission (printed book vs. interactive book) and classroom performance? Does the device really affect students' motivation to read? In everyday practice, what motivates teachers to favour an interactive book over a printed text in developing students' skills? Do higher education institutions and institutional networks help them to acquire the necessary knowledge, skills and experience?

**Research in Hungary**

The first research conducted on interactive books in Hungary was related to the application entitled *The Diamond Half-Crown of the Little Rooster*. The app was developed by the interdisciplinary research team of Moholy-Nagy University of Arts for Android and iOS devices for 5-8 year old children learning to read.[9] Its use was tested several times by the developers of the Creative Technology Lab (MOME TechLab).[10] In 2013, empirical research continued in the Art for Education Research Group (MűOK) of the University of Szeged. Children aged 3–6 years watched and listened to the story on a computer (inducing interactions and movements by using the computer mouse). The data recorders made a report and video recordings of the user process. The following year, researchers at MűOK mapped the preschool and home user habits

[8] Contini, Annamaria et al.: Guidelines for Digital Storytelling in Early Childhood Education. STORIES: foSTering early childhOod media liteRacy competencIES Erasmus + KA2 - Cooperation for innovation and the exchange of good practices. Strategic Partnerships for school education 2015-1-IT02-KA201-015118 https://ec.europa.eu/programmes/erasmus-plus/project-result-content/fede56b0-7a42-4bde-9b4d-463871c653c2/GUIDELINE_English%20language.pdf (Accessed 24.01.2024.)
Bényei Judit - Ruttkay Zsófia: Interaktív mesekönyv gyerekeknek – A kiskakas gyémántfélkrajcárja, esettanulmány. [Interactive Storybooks for Kids – The Diamond Half Crown of the Little Rooster, a case study]. – In.: 7th. Hungarian Conference on Computer Graphics and Geometry, Budapest, 2014. 02. 19. – 2014. 02. 20. 6. / eds. Szirmay-Kalos László, Renner Gábor. – Bp.: MTESZ János Neumann Computer Society, 2014. p. 72–78.
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Guernsey, Lisa – Levine, Michael H.: "Getting Smarter About e-Books for Children." – In.: Journal. Vol. 71. No. 2. May, 2016. p. 3–43. Idézi: Estefani, Thales – Queiroz, João, 2018.
Marzano, A. – Tammaro, R. – Notti, A. M. – D'Alessio, A. – Estasio, D.: The use of e-books in education to improve learning. – In.: International Conference on Education and new Learning Technologies. 5. 2013. Barcelona, Spain: Edulearn 13 Proceedings, 2013. p. 7. Cites: Marcele Cassol Licht – Berenice Santos Gonçalves: Interatividade e Motivação em Livro Digital. Interactivity and motivation in digital book.
Sigradi. Vol. 2. 2015. Issue 3. p. 248–255. http://papers.cumincad.org/data/works/att/sigradi2015_6.341.pdf (Accessed 24.01.2024.)
Yokota, Junko – Teale, William H.: Picture Boks and the Digital World. – In.: The Reading Teacher. 67. 2014. 8. May. p. 577–585. https://www.researchgate.net/publication/261925043_Picture_Books_and_the_Digital_World (Accessed 24.01.2024.)

[9] Arany László: *A kiskakas gyémánt félkrajcárja*, [The Diamond Half Crown of the Little Rooster], illustration: Szűcs Barbara, MOME TechLab.
In 2013 it was granted the Design Award for the Early Appearance and the quality of the implementation in the Visual Communication category by the Hungarian Design Council. Its originality was also highlighted at the Bologna International Children's Book Festival in 2014, and it was invited to the Digital Children's Book Fair in Japan.

[10] This is how *the Diamond Half Crown of the Little Rooster* – the tablet tale of MOME TechLab was made. https://www.youtube.com/watch?v=bk3PikVQjWc (Accessed 24.01.2024.)

of about 200 subjects aged 3–6 and 7–10 years. This research focused on the differences between children receiving the tale entitled *The Diamond Half-Crown of the Little Rooster* in digital and print form.[11] In 2017, MOME TechLab researchers conducted an eye-tracking study that confirmed, among other things, the significant impact of moving and visually accentuated elements on user's attention: based on indications of a colour map, highlighted words of the text on certain pages of interactive books, as well as the back and forward navigation arrows received increased attention.[12]

Overall, confirming the empirical research results published in international studies, the measurement results of MOME TechLab and MűOK also demonstrated that "users found, evaluated positively, and interpreted the possibilities of interaction as a »replay« of the narrative in which the image, sound and movement induced by interaction either reinforced the meaning of the text"or filled the meaning potentials left free in the text. The following statements can serve as a starting point for further research: "1. Children aged 7–10 are (yet) open to artistic, non-commercial pictorial representation. Archaic representations, such as those featuring the graphics of *The Diamond Half-Crown of the Little Rooster* »live« on even the most modern devices. 2. Children reacted critically to the difference between the image and the text or the representation of a concept and the "their own conceptual image"; the text or their own preconception was not overwritten by the (divergent or complementary) pictorial content. 3. The new interactive medium also holds promising opportunities for habituating to letters and teaching reading. 4. In interaction design the relationship between the reader and the characters portrayed, as well as the nature of the reader's existing mental images should be an important consideration over the practice of operating primarily (or exclusively) in IT terms.[13] *(Figure 1)*

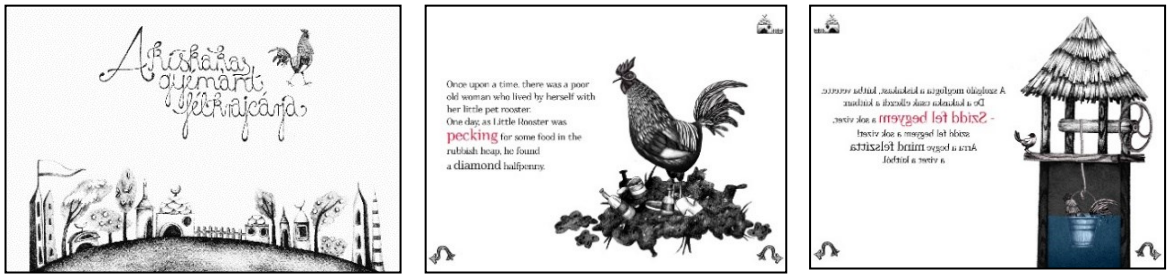


*Figure 1*
The Diamond Half-Crown of the Little Rooster, MOME TechLab, picture series

[11] Art for Education Research Group of the University of Szeged, www.muok.ucoz.hu
2014. *App-nap: Az interaktív mesekönyv*. [App-Day: Interactive Storybooks]. Conference. Szeged: Art for Education Research Group, Juhász Gyula Faculty of Education, the University of Szeged – Moholy-Nagy University of Arts – Creative Technology Lab.

[12] The research was carried out within the framework of the EU FP7 "TERENCE" and the "Interactive children's book research" project of MOME Service Nonprofit Kft. The implementation of the project was supported by the Ministry of the Interior – National Chief Architect Office.

[13] Ruttkay Zsófia – Bényei Judit – Sárközi Zsolt: Evaluation of Interactive Children Book Design: The Case Study of "Little Rooster" – In.: Methodologies and Intelligent Systems for Technology Enhanced Learning. / Editors Tania Di Mascio, Rosella Gennari, Pierpaolo Vitorini, Rosa Vicari, Fernando de la Prieta. Advances in Intelligent Systems and Computing, 292, Springer, 2014. p. 109–117.
Ruttkay Zsófia: Az interaktív elemek használata a T csoportban. [Using Interactive Elements in Group T – In.: Daróczi Gabriella – Ruttkay Zsófia – Varga Emőke: Az interaktív mesekönyv a kisgyermekkori képességfejlesztésben. [Interactive Storybooks in Early Childhood Skills Development]. TÁMOP 4.1.1.C-12/KONV-2012-0004. [Establishing third-generation coordinated service portfolio and management system and implementation of strategic optimization in the form of community-type higher education co-operation in South-East Hungary], 2014. (online higher education resource).

In 2014-2015, the Art for Education Research group measured user experience through a well-known Aesop's fable, *The Ant and the Grasshopper* picture book variations, and *The Ant and the Grasshopper* applications developed by the internationally known TabTale and Clue Pop *(Figure 2).* The main topics of research were: the differences between prior textual knowledge and user experience; priorities in the process of perceiving still and moving images; the aesthetic effect of fairy tale adaptations on children aged 3–8, schoolchildren with learning disabilities and triplets; the enjoyment index of primary school and social studies teachers as well as lower primary school teacher trainees as mediators of the applications.In addition to the above, the data recorded on 100 children aged 3–6 in the nursery schools of Szeged and the Southern Great Plain region of Hungary by teams of two or three people in two stages (first via live speech and then via an interactive book) also allowed for testing the relevance of the following aspects of research: characteristics of subjects' motivation and attitude (behaviour; reason for asking for help; ways of expressing emotion; reason, time of interaction; time of viewing); hierarchies of the decoding process of media; the relationships between interactivity and self-reflexivity. The research results were presented by the data collectors at a conference;[14] for a theoretical summary, see Emőke Varga: *From Art Interpretation to Case Study. The Grasshoper and the Ant.*[15]


*Figure 2*
The first page of interactive books entitled The Ant and the Grasshoper developed by TabTale and Clue Pop

The research conducted by the Art for Education Research Group (MűOK) in 2016-2018, testing the reading comprehension processes in students using the digital storybooks of the largest Central European developer BOOKR Kids was thematically related to the two most basic tasks of Hungarian education, improving students' reading skills and comprehension skills.

The questions asked by researchers and the associated criteria were, on the one hand, built on the results of the research group's previous projects and, on the other hand, they were formulated reflecting on the current topics of international literature: what differences are there in the transmission and reception process of a tale through reading it aloud, printed and interactive books; what makes children who watch a tale interact; is memory affected by the cooperative and confrontational relationship of the media; does the music content of applications affect meaning making?

[14] 2015. *A kicsi a Szorgos és a Lusta*, [The Small, the Diligent and the Lazy], Conference. Szeged: Art for Education Research Group, Juhász Gyula Faculty of Education, the University of Szeged
[15] Varga Emőke: Az interaktív könyv: Teóriák és példák. [Interactive books: Theories and Examples]. Bp.: L'Harmattan Kiadó, 2020. 83–111.

The data collection carried out in nursery schools and primary schools in the city of Szeged and in the Southern Great Plain region of Hungary was based on continuous contact with the employees of BOOKR Kids and, on an experimental basis, in different age groups, heterogeneous preschool and school environments using applications with different aesthetic standards.[16]

In addition to studies published in journals and conference proceedings, the findings of theoretical and empirical research in Hungary have been summarized in the following independent publications: a curriculum that has been used in higher education practice for several years (Gabriella Daróczi – Zsófia Ruttkay – Emőke Varga: *Interactive Storybooks in Early Childhood Skills Development,* 2014), a study collection presenting the interactive books of BOOKR Kids Kft. (Boldog Anna et al.: *Books Come to Life. Introduction to the Theory and Practice of Interactive Books through BOOKR Kids Applications*, 2018),[17] and a theoretical monograph published in Hungarian (Emőke Varga: *Interactive Books. Theories and Examples*, 2020).

**Principles of the pedagogical development of BOOKR Kids Kft**

The applications used as the "research material" of the empirical study presented in this publication were developed by BOOKR Kids Kft., the largest company in Central and Eastern Europe and currently the only company producing interactive books in Hungary. The books of the startup company,[18] which has won several international awards, are suitable to be used both at home (*BOOKR Kids Tale Collection*) and classroom settings (*BOOKR School, BOOKR Class*) due to their topics, genres, user options and the types of games and tasks built into the books. The basic goal of BOOKR Kids is to provide fun and meaningful activities for children when they spend time with digital technology. To this end, it develops its technology based on empirical research findings, building a bridge between books and the digital world to provide children with a rich storytelling experience. With its apps, it allows to bring stories closer to kids – on their favorite devices (…). As the interface is ad-free, it also meets both parents and teachers' expectations of safety."[19]

The pedagogical goals of the enterprise were summarized by the developers and the authors of the publication as follows. "The primary goal of the educational program of BOOKR Kids is to

[16] 2017. *Ki látott, ki hallott?* [Who Saw it, who Heard it?] Conference. Szeged: Art for Education Research Group, Juhász Gyula Faculty of Education, the University of Szeged

[17] Boldog Anna – Daróczi Gabriella – Horváth Dorka – Horváth Dorottya – Ruttkay Zsófia – Varga Emőke: A könyvek életre kelnek: Bevezetés az interaktív könyv elméletébe és gyakorlatába a Bookr Kids alkalmazásaival. [Books Come to life: Introduction to the theory and practice of interactive books with the applications of Bookr Kids]. / ed. Varga Emőke – Budapest: Móra-BOOKR Kids Kft., 2018. Extracts of the publication are available at the following link: https://www.scribd.com/document/381846517/A-Konyvek-Eletre-Kelnek-PDF-2 (Accessed 24.01.2024.)

The volume served as curriculum material for the in-service teacher training course entitled *Interactive Books, Developing reading and reading comprehension with BOOKR Kids digital storybooks* accredited by the Faculty of Education of the University of Szeged in 2018 and launched in cooperation with BOOKR Kids.

[18] The company entered the international market in 2017, its main partner being the largest Czech and Slovak publisher, Albatros Media Group. It builds relationships with Harper Collins and Quarto Group and also works with large companies such as Telekom, Samsung, K&H Bank and Unilever. It produces interactive stories in several languages, Hungarian, English, Czech, Norwegian, German and Chinese. In 2020, BOOKR Kids became the winner of the Central European "Startup of the Year" category.

[19] Horváth Dorka: BOOKR Kids – ahol a mesék életre kelnek. [BOOKR Kids – Where Tales Come to Life]. A BOOKR Kids-könyvek fejlesztésének folyamata, története és elvei. [The Process, History and Principles of the Development of BOOKR Kids Books]. – In.: Boldog Anna et al., 2018. 60.

develop literacy skills and digital skills in an extensive and innovative way and to instill and increase the love of reading of students aged 6–10 and those of aged 11–12 through experiential learning, and to broaden the scope of reading comprehension. In addition to all this, an important goal is to develop literary sensitivity, to make students familiar with aesthetic, moral and cultural values and to create a community of young people who love reading and books, stories, poems, rhymes, short stories, and novels play a significant role in their life. We have defined six principles for developing interactive books for education, which as are follows. 1. Safe and controlled digital content: the BOOKR Suli application is a closed system with content controlled by a professional group exclusively composed of teachers. 2. Adaptability: according to the digital interface and the poetic features of texts (tales, poems), BOOKR Kids books take into account children' age characteristics, but according to the dynamics of interactions, users also have an impact on the innovation themselves. 3. Differentiation: the use of the tool allows for several different forms of organising teaching and learning activities in the classroom: pair work, small group work and cooperative learning. Tasks with different levels of difficulty can be adapted to students' knowledge 4. Collaboration: the development of BOOKR Kids extends the collaborative relationship between teachers and students to parents as well. 5. Increasing opportunities: the development of BOOKR Kids is suitable to reduce the socio-economic and socio-cultural disadvantages in the learning community. 6. Unity of the abstract and the concrete: according to the algorithm of lessons teaching letters, developing language skills and analysing literary texts, the application allows for stages of lessons teaching abstraction to become fun and activity-oriented, all of which facilitates effective learning."[20]

**Educational and research theoretical context**

The surveys presented in the publication are based on the content of Hungarian Language and Literature[21] in the National Core Curriculum and Curriculum Framework.[22] We did not create a new – ideal – concept of reading tailored to interactive books either when we designed the survey or when we summarised the main research findings of the study. Based on the concept of reading outlined in the above documents and in educational practice, we merely wanted to see whether it is easier for students to develop strategies for reading comprehension and to construct one or more possible stories/interpretations in the modally rich media environment of interactive books, which also offers motor interactions, compared to their peers in the control group using the printed text.

In interactive book reading, the representations of meaning are stratified in a wider space, and in a relation of directions that have not been applied so far. The tool expands the meaning space compared to the printed text. In addition to the written text, the interactively movable images and the spoken text that can optionally be started also have a semiotic function, carry meaning and convey information. Interactive books are an epoch-making innovation, since, even if they

[20] Daróczi Gabriella: BOOKR Kids – ahol a mesék életre kelnek. Pedagógiai célkitűzések. [BOOKR Kids – Where Tales Come to Life. Pedagogical Objectives]. – In.: Boldog Anna et al., 2018. 61–62.
[21] 110/2012. (VI. 4.) Government Decree on the Publication, Introduction and Application of the National Core Curriculum]. – In.: Magyar Közlöny, 2012. No. 66. 4 June 4. p. 10635–10848.
https://ofi.oh.gov.hu/sites/default/files/attachments/mk_nat_20121.pdf (Accessed 24.01.2024.)
[22] Curriculum Framework for primary school grades 1–4.
http://kerettanterv.ofi.hu/01_melleklet_1-4/index_alt_isk_also.html (Accessed 24.01.2024.)
Curriculum Framework for primary school grades 5–8.
http://kerettanterv.ofi.hu/02_melleklet_5-8/index_alt_isk_felso.html (Accessed 24.01.2024.)

do not ultimately eliminate the "task" of readers to interpret (beautiful) literary texts, they still markedly rewrite it. In the interactive, hybrid space offered by the tool, the interpretive role of the reader is transformed into the role of a participant who also performs motor activities. Through working memory related to perception, due to the media richness of the printed text, the reader is likely to have immersed himself/herself in reading so far. When he/she encounters an interactive book, however, the basis of immersion is a chiastic relationship, one of the poles of which is embedded in the direct, concrete, even tangible "here and now" perception. The significance of this fact for the pilot hypotheses laying the foundations for the study cannot be overestimated.

Taking all these characteristics into account, we emphasize that the classroom activity examined with a control group can be interpreted according to the PIRLS definition of reading literacy.[23] This definition does not restrict reading to fictional texts. However, any statement that structures the definition of text is also relevant in the approach to "reading" fictional texts. In other words, whether the student interpreter or the participating-interpreter enters the world of the "text" provided by a printed or interactive book, its role requires interactivity, constructiveness, reflexivity, as well as developing a strategy of orientation and movement in the text. And these activities, in the nature of things, presuppose the presence of an interpreter or interpreting participant who "has positive attitudes towards reading and reads for pleasure."[24] (The implementation of digital tools in the classroom obviously increased students' desire to read. Our question about this also appeared explicitly among the questions on the worksheets.)

In accordance with the curriculum requirements rooted in the tradition of the Hungarian education system and still in force today, reading is, in essence, a complex, active process of constructing meaning: comprehension. In the case of hybrid media, the text can be listened to and it can be repeated multiple times. Thus while measuring reading comprehension, we took into account the possibility of acoustic repetition, and that students are better at listening comprehension than reading comprehension until the age of 10, as it is based on many years of experience, compared to reading comprehension.[25]

When creating the survey tasks, we also relied on a hierarchical model of reading comprehension, both in the case of students using the printed text and interactive book. This meant that in our approach literary text analysis lessons were structured according to progression from smaller to larger units, and the measurement of learning outcomes was determined by different degrees of comprehension.[26] We measured the success of decoding thoughts and information expressed in texts; the effectiveness of searches; their valorizability with regards to the whole story; the way of how predictions were made; the effectiveness of exploring ad hoc meaning and understanding causal relationships; comprehending and constructing meaning from the text; the productivity of contemplative thinking, i.e. the ability to form an opinion. Thus, by defining the perspectives of

[23] Vári Péter - Balázsi Ildikó - Bánfi Ilona: Hogyan olvasnak a magyar 9 évesek? [How do Hungarian Children Aged 9 Read?] – In.: Iskolakultúra. 2003. Issue 8. p. 118–138.
http://real.mtak.hu/60607/1/EPA00011_iskolakultura_2003_08_118-138.pdf (Accessed 24.01.2024.)
[24] Vári Péter - Balázsi Ildikó – Bánfi Ilona, 2003. 119.
[25] Gósy Mária: A szövegértő olvasás. [Reading Comprehension]. – In.: Anyanyelv-pedagógiai. 2008. Issue 1. http://www.anyanyelv-pedagogia.hu/cikkek.php?id=25 (Accessed 24.01.2024.)
[26] Adamikné Jászó Anna: A szövegértő olvasás fejlesztése. [Developing Reading Comprehension]. – In: cf. Csak az ember olvas. Az olvasás tanítása és lélektana. [Only Humans Read. The Psychology and Teaching of Reading]. – Bp.: Tinta Könyvkiadó, 2003. p. 96.

the study, we tried to systematically examine reading according to its character as a complex cognitive process.

# THE GOALS OF THE CASE STUDY

## Brief formulation of goals

The goals of the case study are, on the one hand, (1) to prove that the discretely animated interactive books by BOOKR Suli (1) develop students' language awareness in many different ways, (2) and have a positive impact on students' performance in reading comprehension; (3) on the other hand, to prove that the BOOKR Suli software can be implemented by teachers of Hungarian language and literature in the classroom and meets the goals and requirements defined by the National Core Curriculum and Curriculum Framework. (4) It is also considered important to convince teachers of the advantages of implementation.

## Contextualization and justification of goals

In view of the fact that the definition of an interactive book, which has been available on the international market since 2010 as a new genre capable of digital transmission of fairy tales and other fictional genres, has only been outlined in recent years, and that it took some time to reach consensus on its definition. In order to present the goals of the pilot study in more detail, it is necessary for us to point out the following:

An interactive book is a type of application accessible on small versions of computers that are becoming increasingly popular today, on tablets and smartphones. Thus it is not the same as an e-book because it contains moving images and you cannot only read it but you can also listen to it: reading by actors, effects, and music play an important role. Due to the segmentation of its motion sequences and the fact that the text is made visible, it is different from an animated film as well although interaction "brings to life" fairy tale heroes on the display and objects can be made to move. However, unlike in video games, the text plays a decisive role in them. A tale (and another short prose and lyrical piece of work) is a pre-written, narratively structured linguistic content. In terms of communication, interactive books are a genre related to books meant for silent reading and reading aloud since, at least as far as today's user habits are concerned, they do not substitute but keep their printed "original" versions up-to-date, they do not replace them, but expand and modernize them.

Multimedia interactive books, i.e. the ones that use spoken words, readable/visible texts, still images, moving images and non-linguistic spoken modes for meaning making can be a means for students to transfer knowledge to other contexts, not only because of their media richness, but also because of the structure of the application that provides opportunities for interaction. Thus, due to the mutually reinforcing operation of visual, linguistic and auditory channels and the opportunities of interactions in students' intermediate spaces that assume active user gestures, previous research suggests that students' app-mediated knowledge can lead to better performance in a new context.[27] Therefore we considered it justified to compare the results of knowledge processing through interactive books and printed books and to further develop the books of the

[27] Bencsik et al.: A BOOKR Kids-mesék hatása. [The Impact of BOOKR Kids Tales] – In: Boldog Anna et al., 2018. 77–106.

BOOKR Suli software involved in the pilot study associated with the surveys: to develop their new, research-controlled versions.
As the BOOKR Kids app belongs to the type of interactive books that require both "targeted" and "traditional"[28] reader participation, i.e. adapting to the public education environment, it is discreetly animated and allows users to use gestures to a limited extent, it can be evaluated as a new 'temporary' genre of the communication situation of our age. In other words, it is also suitable for preserving and extending the tradition of reading and listening to fairy tales, the whole point of which is in-depth, meaningful reading and an empathetic experience of the story.

## A more detailed description of goals

(1) By the term linguistic awareness we mean knowledge about the language, i.e. the content of metalanguage knowledge. Thus while conducting our our pilot study, we intended to prove, on the one hand, that the media richness of discreetly animated interactive books contributes to students' vocabulary expansion by creating multiple layers of meaning representations. On the other hand, the active and passive part of the mental lexicon, (the stored lexical units: word stem, derived words, compounding, collocation) is activated more rapidly in the hybrid media environment.[29] In the listening mode, the speaker's speech produced in accordance with the phonological rules of the Hungarian language contributes to students' conscious use of language at sentence and text level by strengthening syntactic awareness.

(2) As the goals of reading in reading digital and printed texts are the same, and there is a considerable overlap between the cognitive processes involved in decoding symbols to derive meaning from text, the pilot study aims to compare the similarities and interpret differences in comprehending the two text types (the quasi monomedial print book one and the new multimedial one) by referring to these characteristics as a common platform. The basis of comparison is the digital literary narratives belonging to learning material[30] of the subject Hungarian language and literature as specified in the Curriculum Framework. Tu sum up, our aim within this second aspect was to highlight the similarities and differences between the two types of narratives (print and digital) in different problem situations that arise in a literary analysis lesson, and to explore and confirm the impact of digital storytelling on developing narrative skills and digital sub-skills (collection, use, storage of information).

(3) In an international context, it is also true that research on the integration of interactive books in the classroom has only just begun. As mentioned in the introductory chapter, even less research has been done on it in Hungary so far. In fact, it is limited to case studies conducted by

[28] In terms of user-device interaction, Turrión distinguishes three types of participation, and describes the third as a true form of app communication: (1) traditional participation (decoding letters, turning pages), (2) active participation (complex interpretation of postmodern configurations), (3) interactive participation (physical collaboration with the book) Turrión, Celia, 2014. In Aline Frederico's classification, (1) the user's role as a reader indicates the weakest degree of interaction, (2) the user's level as a co-author is moderately strong, (3) the user's role as a controller indicates the most intense degree. Frederico, Aline, 2015.
[29] For the concept of mental lexicon, see: Gósy Mária – Kovács Magdolna: A mentális lexikon a szóasszociációk tükrében [The Mental Lexicon in the Light of Word Associations] – In: Magyar Nyelvőr, 2001. Vol. 125. No. 3. p. 330–354. http://www.c3.hu/~nyelvor/period/1253/125306.htm (Accessed 24.01.2024.)
[30] Curriculum Framework for grades 5-8 of the primary school. Hungarian language and literature. In: Appendix 2 of Decree 51/2012. *(*XII. 21.*)* of the Ministry of Human Capacities, http://kerettanterv.ofi.hu/02_melleklet_5-8/index_alt_isk_felso.html

The Arts Education Research Group, the University of Szeged, *Juhász Gyula Teacher Training Faculty* involved in the background research of the present pilot study, which present the use of interactive books by children aged 3–6 and 7–10, respectively. These studied gained national publicity only in 2018 when the volume titled *Books Come to Life. An Introduction to the Theory and Practice of Interactive Books through BOOKR Kids Apps* was published.[31] For this reason, relying on results of international studies and experience of previous domestic survey data collection, we considered it justified to evaluate, identify and describe the most important process characteristics that can be utilized for educational settings in a broader geographical and socio-cultural context within the pilot study and specifically in primary schools. Thus, we considered it our task to investigate the extent to which multimedia applications can be integrated into the classroom and to map their transfer effect on reading comprehension skills in relation to complex skills.

(4) By the emergence of the new hybrid genre in the first decades of the third millennium, adults face all the contradictions and challenges that have always accompanied media shifts (see fairy tales told orally followed by printed books, and then the phobic phenomena accompanying the emergence of picture books as a new form of media). It is obvious that while the number of tales digitally transmitted on small devices is growing rapidly on international online markets, in Hungary, even today, such tales play a limited role in teaching and learning, have little resonance in professional circles, and they are not in proportion with either their genre or their significance in the history of communication, or the opportunities that they could provide in the teaching and learning process. By conducting the present research and case study, we sought to take the initial steps in a longer development process and intended to reveal the role and benefits of interactive books in the transmission of literary works in Hungarian language and literature lessons of the primary school.

[31] Bencsik Zsombor et al., 2018. 77–106.

# LITERATURE BACKGROUND OF THE CASE STUDY

As indicated above, interactive books have been available on the international book market for ten years, and while reviewing the literature, we found that not much research has been published on its integration into the educational process. Thus there are hardly any studies on the methodology and didactics addressing the classroom implementation of the tool that researchers or teachers could rely on. Thus, in our critical approach to the goals of the publication summarizing and evaluating pilot experiences, we were able to rely on academic literature that could be considered less homogeneous.

Of the target areas of the pilot study, we reviewed the literature of the topics that are related to the first goal in content, such as the ones that present *interactive books* as objects that induce and maintain a specific activity due to their *media richness* and as a new genre of communication.[32] While investigating it, we found that the emphasis in the literature is placed on the impact of modality changes, on how children become users. A change in their status and function requires the acquisition of a new communication competence. Interactions basically affect students from a perceptual point of view, who in this new situation expect digital content to respond to the manipulation they perform. Thus, as stated in the literature, a so-called "process of action and outcome" come about while they participate in it.[33] The literature we reviewed in the pilot study presents the applications in an explanatory way, thus allowing for designating the system points of the pilot survey.[34]. Nikolaev and her team draw attention to the complex relationship and interrelationships of the elements in the transmission of narratives. In connection with manipulations, they emphasize that narrative meanings are mediated by the experience of perception.[35] Frederico's findings highlight the beneficial effect of the playfulness inherent in interactive books on children's creativity as due to this they engage and motivate even readers who have difficulties decoding a literary text.[36]

When designing our pilot study, we, however, had to take into account that managing the operating systems of the devices through which students can access interactive books could pose a problem for them. Yokota and his team draw attention to what changes the appearance of the

[32] Serafini, Frank – Kachorsky, Dani – Aguilera, Earl, 2015.

[33] Sargeant, Betty: Interactive Storytelling: How Picture Book Conventions Inform Multimedia Book App Narratives. – In.: Australian Journal of Intelligent Information Processing Systems, Vol. 13. Issue 3. (2013) https://www.academia.edu/2490557/Interactive_Storytelling_How_Picture_Book_Conventions_Inform_Multimedia_Book_App_Narratives (Accessed 24.01.2024.)

[34] Ruttkay Zsófia: Az interaktív könyv fogalma és típusai. [The Concept and Types of Interactive Books]. – In.: A könyvek életre kelnek. [Books Come to Life]/ ed. Varga Emőke. – Bp.: Móra – BOOKR Kids, 2018. p. 9–38.

[35] Al-Yaqout, Ghada – Nikolajva, Maria: Re-conceptualising picturebook theory in the digital age. – In.: Barnelitterært Forskningstidsskrift. 2015. Vol. 6. 1. p. 9–10. https://doi.org/10.3402/blft.v6.26971 (Accessed 24.01.2024.)

[36] Frederico, Aline: Changes in picture book aesthetics: performance in picture book apps. – In.:The Child and the Book Conference: Children's Literature. March 26-28. 2015. University of Aveiro Education Departement. https://prezi.com/sjo9631wlhix/changes-in-the-picturebook-aesthetics-reader-performance-in-picturebook-apps/ http://childbook2015.web.ua.pt/the_child_and_the_book_conference_site.pdf (Accessed 24.01.2024.)
Frederico, Aline: The future of the reader or the reader of the future: Children's interactive picture book apps and multiliteracies. – In.: Cadernos de Letras da UFF Dossiê: A crise da leiturae a formação do leitor. January 2016. nº 52. p. 121–139.
https://www.researchgate.net/publication/316317374_The_future_of_the_reader_or_the_reader_of_the_future_Children's_interactive_picturebook_apps_and_multiliteracies (Accessed 24.01.2024.)

iOS operating system has brought to e-picture books.[37] Our survey tasks were determined by the modality offer of BOOKR Suli developments that allows for manipulation and interactions. We made changes to the BOOKR Kids applications involved in the pilot according to the features of interactive books designated in the literature. We made recommendations to the developer about changes that would result in discrete animation, on the one hand, in connection with certain dynamic events in literary stories, and on the other hand, in connection with the mood of certain fictions and the characteristics of the object world. Almost all of these modifications can be induced by touch, and we hypothesize that they have an impact on students' meaning-making activities and aesthetic experiences.

Of the target areas of the pilot study, the literature related in content to the second goal gives an overview about the conventional system of *visual language and representation.* On the one hand, it presents the knowledge, skills and analysis methods belonging to the field of visual analysis,[38] on the other hand, the text-creating characteristics of different media and the narrative abilities that ensure the exploration of the content and logical connections of texts. Thus, we also relied on the theoretical works that show the overlapping relationships between media.[39] There are very few studies that approach the phenomenon with a transdisciplinary perspective in accordance with the media richness of the interactive book genre, and thus their professional and scientific value is of even greater importance.[40] The novelty of their approach is that they present the relationships between image and text: an analysis presentation of the phenomenon of how the divergent or, in the case of valuable aesthetic solutions, convergent movement of these elements makes the process of meaning making impossible or ensures it;[41] how the narrative can be recognised in the media richness of the device;[42] what systems of signals are possible, and how they can motivate the viewer to create a story, and how the viewer can gain access to the knowledge that comes from the narratives.[43] The studies conducted on this content segment pointed out the interoperability between storytelling and visual narrative, the relationship between

[37] Yokota, Junko – Teale, William H., 2014.

[38] Bal, Mieke: Látvány és narratíva egyensúlya. – [Balance of Sight and Narrative]. In.: Narratívák 1. Képleírás, képi elbeszélés. [Narratives 1. Picture Description, Pictorial Narrative]./ ed. Thomka Beáta. – Bp.: Kijárat Kiadó, 1998. p. 155–182.
Kibédi Varga Áron: Vizuális argumentáció és vizuális narrativitás. [Visual argumentation and visual narrative] – In.: Athenaeum. Kép – képiség. [Image – Imagery]. 1993. Vol. 1. Issue 4. p. 166–179.
Boehm, Gottfried: A kép hermeneutikájához. [To the Hermeneutics of the Image]. – In.: Athenaeum. Kép – képiség. [Image – Imagery]. 1993. Vol. 1, Issue 4. p. 87–111.
Boehm, Gottfried: A képleírás. [Picture Description]. – In.: Narratívák 1. Képleírás, képi elbeszélés. [Narratives 1. Picture Description, Pictorial Narrative]./ ed. Thomka Beáta. – Bp.: Kijárat, 1998. p. 19–36.

[39] Varga Emőke: Az irodalom – és művészetelméleti kutatások határán: A kiskakas gyémánt félkrajcárja című interaktív könyv szöveg- és kép-kontextusai. [On the Boundary of Literary and Art Theory Research: The Text and Image Contexts of the Interactive Book entitled The Diamond Half Crown of the Little Rooster]. – In.: A színibírálatok szerepe az összehasonlító színháztörténeti kutatásokban a magyar színikritika jellegzetességei a két világháború között. [The Role of Theatre Criticisms in Comparative Theatre History Research, the Characteristics of Hungarian Theatre Criticism between the two World Wars]. http://docplayer.hu/8523145-A-szinibiralatok-szerepe-az-osszehasonlito-szinhaztorteneti-kutatasokban-a-magyar-szinikritika-jellegzetessegei-a-ket-vilaghaboru-kozott.html (Accessed 24.01.2024.)

[40] Varga Emőke: Kalitka és korona. Kass János illusztrációiról. [Cage and Crown. About the Illustrations of János Kass]. – Bp.: L'Harmattan Kiadó, 2007.

[41] Varga Emőke, 2020.

[42] Bal, Mieke, 1997.

[43] Boehm, Gottfried, 1998.

word and image,[44] and the ways in which visual and verbal communication can be applied in an analogous way.[45] Apart from the studies conducted by Hungarian researchers included in the list, no other decisive studies on visual language research were published in Hungary before the start of the pilot: in topics such as image creation, image composition, organization of image elements, control of attention and attention drawing.

The literature related to the third goal of the pilot study provided a background for examining the strategies that students use to construct meaning from text when reading.[46] The corpus used provides an overview of good practices that facilitate comprehension skills development.[47] It describes how *the development goals* of the school subject Hungarian language and literature defined in the *Curriculum Framework* can be achieved, and how to meet the *activities/knowledge and development requirements* of subject pedagogy, which ensures that the development goals are achieved.[48] It defines the concept of digital literacy in a methodological context and presents the subject pedagogical possibilities related to the conscious use of information and communication technologies.[49] It provides a systematic overview of curriculum requirements for teachers using an interactive book in a classroom setting. As a teaching aid, it supports the subject pedagogical algorithm of the implementation with sample lesson plans.[50]

Of the target areas of the pilot study, we reviewed the theoretical works to be found in the literature on topics related to the fourth goal of the pilot in content, which argued for a paradigm shift to be implemented in teachers'methodological culture. Exploring the possibilities of using digital tools, namely interactive storybooks in the classroom, our research was determined by the following consideration: in the context of contemporary cultural and social processes, there is a need for teachers to take an innovative approach to new knowledge. This new kind of attitude definitively breaks down the boundaries between humanities and natural sciences. The spread of digital culture forces the suspension and reinterpretation of the age grading principle ("who, what, at what age one is able to understand it"[51]) related to knowledge acquisition, which has so far been the subject of professional consensus.[52]

As the pilot study examines the impact of a new technology and medium on primary school children's reading comprehension skills, we created an intellectual, professional and

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[44] Varga Emőke: Az illusztráció a teóriában, a kritikában, az oktatásban. [Illustration in Theory, Criticism, Education] – Bp.: L'Harmattan Kiadó, 2012.
Kibédi Varga Áron: A szó-és-kép viszonyok leírásának ismérvei. [Criteria for Describing Word – and – Image Relationships]. – In.: Kép – fenomén – valóság. [Picture – Phenomenon – Reality]. / ed. Bacsó Béla. – Bp.: Kijárat Kiadó, 1997. p. 300–320.

[45] Vizuális és verbális narráció. Szöveggyűjtemény. [Visual and Verbal Narration. Collection of Texts]. /ed. Füzi Izabella. – Szeged.: Pompeji Kiadó, 2011.

[46] Adamikné Jászó Anna: Csak az ember olvas. Az olvasás tanítása és lélektana. [Only Humans Read. The Psychology and Teaching of Reading]. – Bp.: Tinta Könyvkiadó, 2003.

[47] Tóth Beatrix: A szövegértés fejlesztésének elmélete és gyakorlata. [The Theory and Practice of Developing Reading Comprehension]. – In.: Magyar Nyelvőr. 2006. No. p. 457–469.

[48] Tóth Beatrix, 2006.

[49] Tóth Beatrix, 2006., Nagy József: Olvasástanítás: a megoldás stratégiai kérdései. [Teaching Reading: Strategic Issues of Solution]. – In.: Iskolakultúra. 2004. 3. sz. p. 3–26. https://epa.oszk.hu/00000/00011/00080/pdf/ (Accessed 24.01.2024.)

[50] Daróczi Gabriella – Horváth Dorottya: Óravázlat-minták a BOOKR Kids-könyvek oktatásához. [Sample Lesson Plans for Teaching BOOKR Kids Books]. – In.: Bencsik Zsombor et al., 2018. 107–127.

[51] Papert, Seymour: Észrengés. A gyermeki gondolkodás titkos útjai. [Mindstorms. Secret Ways of Children's Way of Thinking]. – Bp.: Számalk, 1988.

[52] Papert, Seymour, 1988.

methodological environment based on the literature review, which also changed teachers' possibly distant and contemplative attitude towards interactive books.[53] This was all the more necessary because in the classroom in which an interactive book is used students "acquire knowledge" differently from how they process a text in print. In accordance with the new knowledge structure, teachers also needed to learn new teaching methods and establish new routines. Relying on the related literature review, as the developers of the pilot we sought to create this intellectual environment from identifying teaching contents through indicating measurable and evaluable knowledge to formulating and solving problems arising in survey design and data analysis.[54]

The modalities of interactive books, which allow for experiential interaction, mobilize the motor cortex and thus trigger (deep) immersion.[55] For parents and teachers the simulations that can be performed in an interactive book appear to be virtually the same as video game simulations.[56] To eliminate the phobic, yet often non-reflective and permissive approach to the new genre, on the one hand, we relied on the literature related to the topics that supports the approach to the new genre from the perspective of the key factors of a narrative. On the other hand, it presents the operation of the regulatory system within which children using interactive books are faced with a situation in which they constantly have to make decisions/choices.

While reviewing the relevant literature and examining simulations, one of the most essential elements of the new genre, we tried to separate the gamification and narrative functions, and we examined the effect of simulations on cognition as well.[57] Of the representation methods of interactive books, it is simulation as the alternative semiotic structure that best distinguishes it from contemporary communication configurations.[58] Thus we examined the representation possibilities of interactive books in terms of the relationship between narrative and game.[59]

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[53] Daróczi Gabriella: Az interaktív könyv az intézményi nevelésben. [Interactive Books in Institutional Education]. – In.: Bencsik Zsombor et al., 2018. 49–56.

[54] Bredács Alice Mária: A hagyományos és az IKT-vel támogatott mérés és értékelés a szakképzésben. [Traditional and ICT-supported Measurement and Evaluation in Vocational Training]. https://www.art.pte.hu/sites/www.art.pte.hu/files/files/menuk/dokument/tudomany/innovacio/zmi/a_hagyomanyos_es_az_iktvel_tamogatott_meres_es_ertekeles_a_szakkepzesben.pdf (Accessed 24.01.2024.)

[55] Grodal, Torben: Történetek szemnek, fülnek és izmoknak. Videójátékok, médium, megtestesült tapasztalás. [Stories for Eyes, Ears and Muscles. Video Games, Medium, Embodied Experience] – In.: Narratívák 7. Elbeszélés, játék és szimuláció a digitális médiában. [Narratives 7. Narration, Play and Simulation in Digital Media]./ eds. Thomka Beáta, Fenyvesi Kristóf, Kiss Miklós. – Bp.: Kijárat Kiadó, 2008. p. 226–257. http://www.c3.hu/~nyelvor/period/1304/130406.pdf (Accessed 24.01.2024.)

[56] Aarseth, Espen: Műfaji zavar: a narrativizmus és a szimuláció művészete. [Genre Trouble: Narrativism and the Art of Simulation]. – In.: Narratívák 7. Elbeszélés, játék és szimuláció a digitális médiában. [Narratives 7. Narration, Play and Simulation in Digital Media]./ eds. Thomka Beáta, Fenyvesi Kristóf, Kiss Miklós. – Bp.: Kijárat Kiadó, 2008. p. 159–175.

[57] Grodal, Torben, 2008.

[58] Aarseth, Espen, 2008.

[59] Eskelinen, Markku: The Gaming Situation. – In.: Game Studies: the international journal of computer game research. Vol. 1. Issue 1. July 2001. http://www.gamestudies.org/0101/eskelinen/ (Accessed 24.01.2024.)

# CHARACTERISTICS OF THE TARGET GROUPS

Device use in the public educational institutions involved in the pilot study was measured in the public educational institutions maintained by the school district, appointed by the Klebelsberg Centre as the consortium leader of the EFOP-3.2.4 project (*Appendix 1*). The BOOKR software, delivered to 1,000 students in 34 primary schools has been available to teachers and students since September 2019. (See a map showing the geographical location of schools and the headcount data in *Appendix 1-2*).

Due to the novelty of interactive books as a new digital literary genre, two target groups were included in the survey at the same time: teachers and students of the pilot schools.

## Target group: Teachers

However, there were fewer teachers and thus also fewer students that could be involved in the empirical research than indicated above. Not all stakeholders undertook the continuous extra work involved in completing the project. The number of participants in the project may also have been affected by the fact that the Klebelsberg Centre as the consortium leader of the project, provided the designated public education institutions with the opportunity to join the project in the framework of the EFOP-3.2.4 project, but it did not expect the institutions and their teachers to make a commitment. For all these reasons, we had to pay special attention to inspiring and motivating teachers. We tried to convince them in two ways: on the one hand, we presented our research findings about the use of interactive books in the classroom so far; on the other hand, we outlined how they could incorporate interactive books into their individual professional development plan and their expected positive effects on teaching and learning. [60]

The following events and organizational forms facilitated motivational activities and creating a motivating environment:

- continuous correspondence between school contacts, teachers and BOOKR Kids developers,
- continuously operating website presenting the basics of the software and user options,[61]
- organizing a webinar presenting software basics and user options,[62]
- presenting the method of integrating the software in the classroom in the framework of consultation and training; presenting useful practices,
- visiting schools that were excluded from participating in training but requested personal information.

[60] Experience of the teacher in-service training course entitled *Interactive books. Developing reading and reading comprehension through the BOOKR Kids digital storybooks* accredited by the Gyula Juhász Faculty of Education of the University of Szeged in 2018 and launched in cooperation with BOOKR Kids provided the professional background and helped to develop the consultation aspects of the pilot.

[61] See https://bookrsuli.hu/

[62] The events of the webinar (Budapest, September 4, 2019, BOOKR Kids Center) were followed by more than 100 teachers. For the broadcast of the event, see the following link: https://www.youtube.com/watch?v=sqrsyVa2SSw&feature=youtu.be&fbclid=IwAR1NTXRR4rK59H-w_-oM21ekq-TOddeihqXyrN-0VKLhhqftsHPwMM4H_So (Accessed 24.01.2024.)

Of the 34 pilot schools, 16 teachers of 9 schools undertook to participate in all phases of the research impact assessment *(Appendix 2)*. Other 23 people filled in the questionnaire *PRE – profile, all teachers (Appendix 3)*. In addition to the 16 respondents mentioned, 3 others answered the questions of the questionnaire *PRE – profile, participating teachers (Appendix 3)* (they were no longer actively involved in the empirical research phases of the impact assessment); 15 people filled in the questionnaire *PRE – methodological principles, all teachers (Appendix 4)* and also 15 people filled in the questionnaire *PRE – methodological principles, participating teachers (Appendix 4)*. The questionnaire *PRE – profile, students (Appendix 5)* was filled in by the 16 teachers involved in the impact assessment and by 2 others involved in the preparation of the impact assessment: the 18 teachers recorded the data of a total of 293 students in the system.

63% of the teachers participating in the research impact assessment were between 40 and 60 years old, 84% were lower grade teachers of the primary school (57%) and teachers of Hungarian language and literature (27%). Almost all of them regularly used ICT tools in the classroom, 42% of them had used tablets for several years. According to their own statement, they were happy to try out the BOOKR School software. To the question, "How did you feel about the information that you would have the opportunity to use digital books in your lessons?" – in both groups (lower grade and upper grade) the same percentage of teachers (69%) responded "I am happy about it" and/or "I am curious about it, I'm looking forward to it".

## Target group: students

The total number of students involved in the survey process by the teachers continuously participating in the impact assessment and its preparation (19 people) was 293 (*Figure 3*). The number of students involved in only certain phases of the impact assessment, taught by teachers who responded more sporadically to online questions was 1926, i.e. the total number of students participating in the pilot was 2219. *Figures 4* and *5* show the average number of students in the schools involved in the impact assessment and the average number of classes per school.

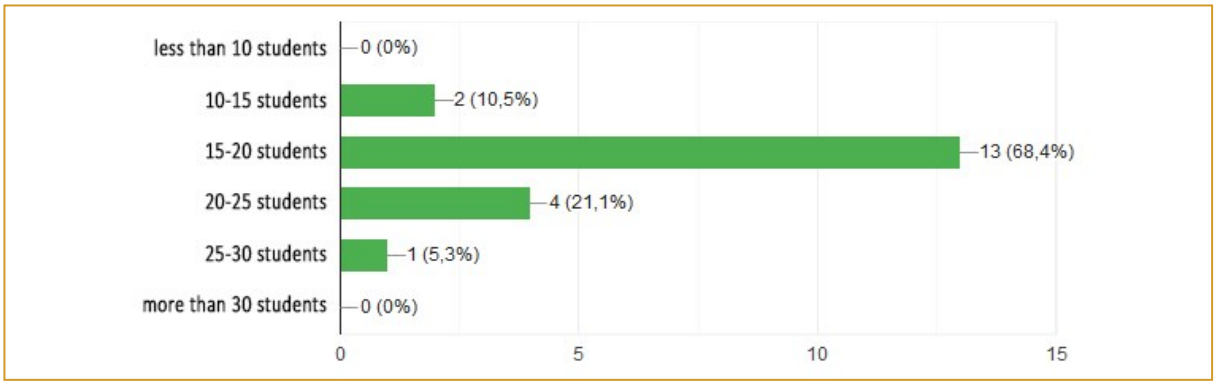


*Figure 3*
Number of classes involved in the preparation of the impact assessment
(Number of respondents: 19 persons)

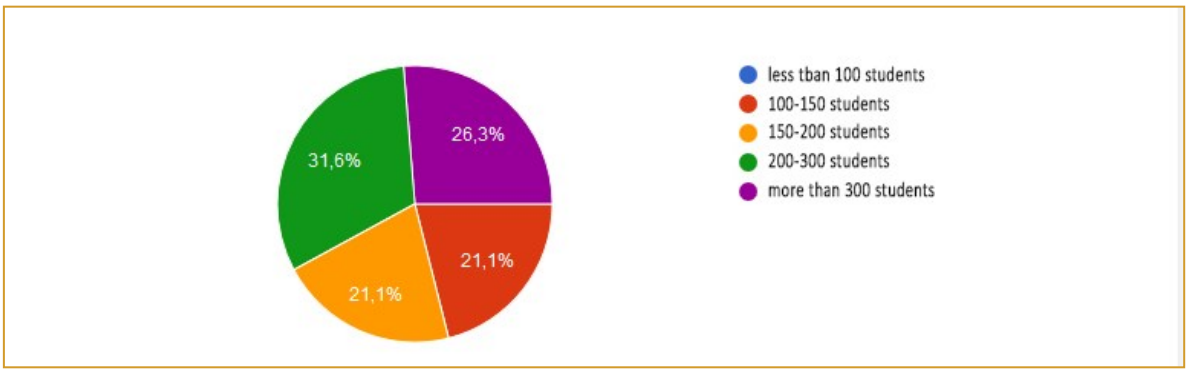


*Figure 4*
Average number of students in the schools involved in the preparation of the impact assessment
(Number of respondents: 19 persons)

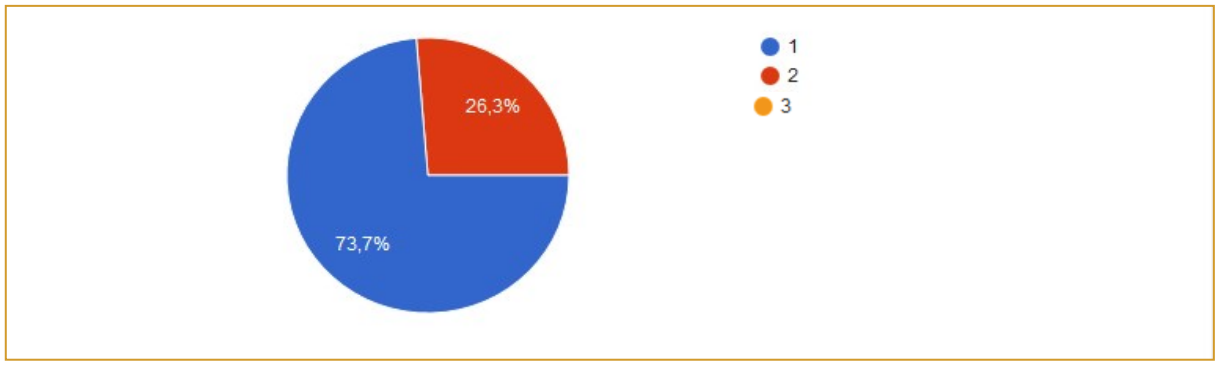


*Figure 5*
Average number of classes per grade and per school in schools involved in the preparation of the impact assessment
(Number of respondents: 19 persons)

The students of the schools participating in the pilot study (which undertook to try out but not to measure the software) live in settlements with a population of less than 1,000, 26.1% with a population of less than 1,000 and 39.1% with a population of more than 2,000. There were mostly 15-20 students in the classes in which the software was tried out *(Figure 6)*. 31.5% of the students participating in the impact assessment live in small settlements with a population of around 1,000 people, 63.2% in villages with more than 2,000 people, and 5.3% in cities with more than 20,000 inhabitants. The schools are predominatly single-grade primary schools; the total number of students is shown in the figure below *(Figure 7)*. Student participants in the survey were 8-12 years of age *(Figure 8)* with a balanced sex ratio: 52% girls, 48% boys.[63]

[63] A compilation of videos of the class work of students participating in the survey is accessible at the following link: https://drive.google.com/file/d/1vNLmcetlfcPCcC0J89-ZuRElIm_pFDzQ/view (Accessed 24.01.2024.)

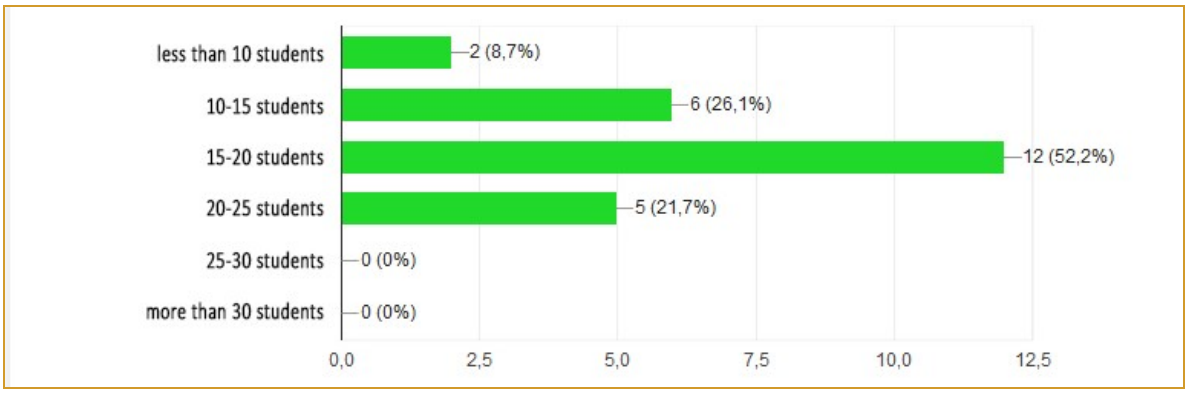


*Figure 6*
Number of classes involved in software testing
(Number of respondents: 23 persons)

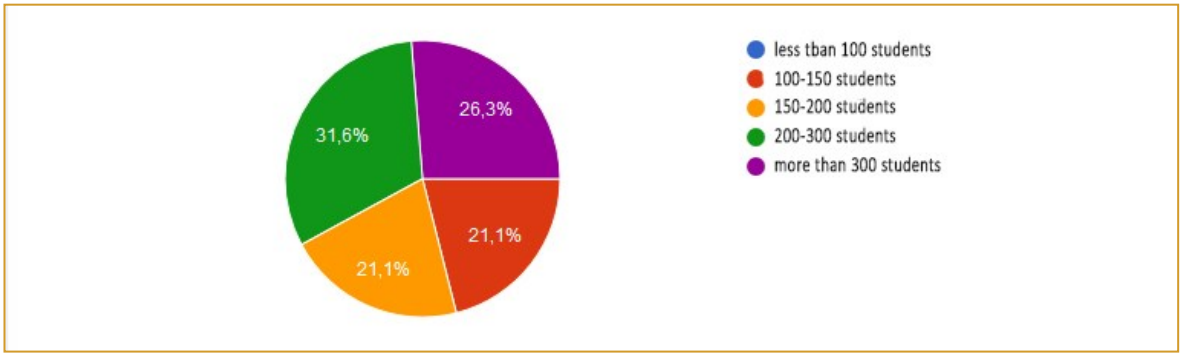


*Figure 7*
Percentage of students in the 9 schools participating in the impact assessment
(Number of respondents: 19 persons)

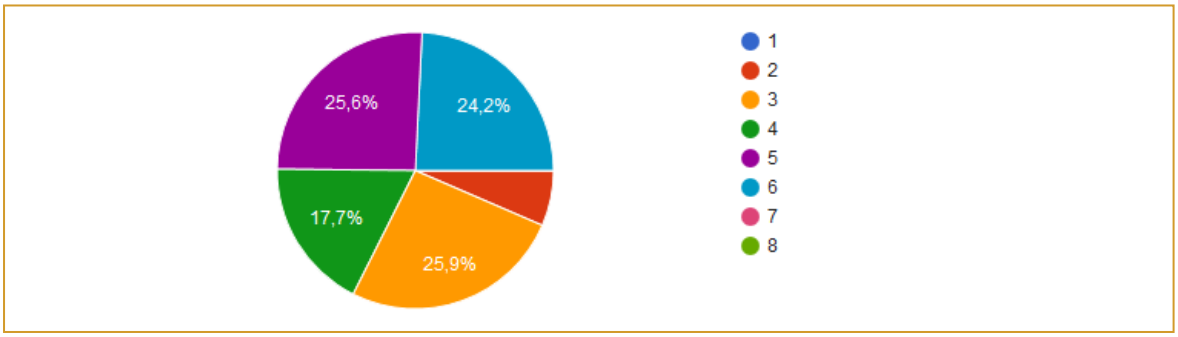


*Figure 8*
Distribution of student participants in the impact assessment by grade
(Number of respondents 18 persons, the number of students surveyed: 293 persons)

# TARGET IDENTIFICATION

1. In accordance with *the first target area*, the aim of the project was to implement the hybrid medium in the classroom in order to
   - increase students' language awareness needed for them to get familiar with and learn Hungarian language and literature in upper grades.
   - make literary text analysis an enjoyable experience and fun for students, to motivate and encourage them to read, and thus increase their love for reading.
   - enable students to learn the basics of the characteristics of creating text in the different types of media: the relationship between written text, sound and image in a simple, playful way.
   - develop students' vocabulary and their ability to recognize linguistic-logical connections, draw conclusions and make comparisons in the process of reading comprehension.
   - make students' preview and simplified summary strategies for reading comprehension more effective.
   - help students to utilize sensory image strategies to comprehend text more fully.

2. In accordance with *the second target area*, the aim of the project was to implement the hybrid medium in the classroom in order to
   - lay the foundations for one of the most important competencies for students' overall academic success: narrative competence.
   - enable students to understand literary texts at a level appropriate to their age by performing the following activities: drawing conclusions, highlighting the main points of the story, telling the story, summarizing and evaluating events.
   - enable students to observe and interpret simple place and time relationships in medially rich texts through specific fairy tales applications at a level appropriate to their age: identify the time and place of the story, the start and end points of the plot, the sequence of plot elements.
   - enable them to orientate simultaneously in a more complex space compared to the structure of the printed text in order to create in-depth and meaningful reading.
   - enable them to recall and express their experiences of complex media effects (e.g. liking, preferences, enjoyment and bad experience, etc.).

3. In accordance with *the third target area*, the aim of the project was to implement the hybrid medium in the classroom in order to
   - enrich the methodological culture of the teachers participating in the program by making them familiar with a teaching technique by which they can lay the foundations for and develop their students' language awareness, reading comprehension skills and narrative competence while analysing fictional texts with interactive books.

4. In accordance with *the fourth target area*, the aim of the project was to implement the hybrid medium in the classroom in order to
   - make teachers familiar with the new digital genre and its transmission possibilities from both a technical and educational-methodological point of view.

- enable them to gain experience on the positive impact of implementing interactive books in the classroom and, accordingly, encourage them to incorporate interactive books into their future teaching practice.

# HYPOTHESES

The goals set in Chapter 1 can be achieved if the following hypotheses are verified.

1. *BOOKR Suli's discreetly animated interactive books develop students' language awareness in many ways.*

The performance of students aged 8–10 using interactive books was compared with that of a control group reading printed texts (synchronic data collection). For 11–12 year-old students, data collection was diachronic: the measurement of interactive book reading was preceded by a lesson in which the printed book was used. Thus we formulated our hypotheses based on synchronic and diachronic relationships.

We hypothesize that interactive books foster
(1) word-level knowledge,
(2) syllable-based reading at word-, sentence- and text level that lay the foundations for reading comprehension.

We hypothesize that due to their media richness interactive books
(3) facilitate and stabilize meaning identification primarily through animations and interactions,
(4) result in better performance in understanding time-space relationship.

2. *The BOOKR Suli applications have a positive transfer effect on students' performance in reading comprehension.*

We hypothesize that interactive books
(1) enable students to get familiar with, recognise and decode relationships between different media and their modes,
(2) allow students to determine the central idea of the text, which lays the foundations for literal and interpretive reading,
(3) can also lay the foundations for metacognitive knowledge (students aged 11–12).

We hypothesize that due to their media richness ensuring synergistic perception, interactive books allow for
(4) building a connection between propositional knowledge and multimedia-mediated new information,
(5) recognising figures of speech and understanding implied meaning (students aged 11–12).

We hypothesize that due to their media richness ensuring synergistic perception, interactive books facilitate global reading comprehension, within this
(6) the traffic between narrative modes that make up a narrative,
(7) identifying narrative information in the text – the key story elements: who, where, when, what, why,
(8) episodic memory.

3. *During the pilot study, the BOOKR Suli software can be implemented in the classroom by teachers of Hungarian language and literature and meets the goals and requirements defined by the National Core Curriculum and Curriculum Framework.*

We hypothesize that

(1) sample lesson plans created in accordance with the goals and requirements defined by the National Core Curriculum and Curriculum Framework in teaching Hungarian language and literature help teachers to incorporate interactive books seamlessly into the classroom.
(2) teachers' current professional and methodological knowledge of digital literature teaching is not sufficient to organise lessons using interactive books in a similar quality to those using printed books.

During the pilot, teachers will be convinced of the advantages and benefits of implementing the BOOKR Suli software.

4. *During the pilot study, teachers will be convinced of the advantages and benefits of implementing the BOOKR Suli software.*

We hypothesize that

(1) getting familiar with the software and incorporating it into the classroom convince teachers of the effectiveness of interactive books in the educational process and they recognize that in addition to printed books it can be beneficial to use interactive books in the classroom in the future,
(2) after implementation, teachers will consider interactive books as digitally transmitted literature rather than gamification.

We hypothesize that

(3) the books of the BOOKR Kids software motivate students to read due to the technomedia transmission mode preferred by the younger generation,
(4) they increase students' motivation and level of immersion more than printed books/texts.

We developed our hypothesis system in the matrix of research aspects published in the international literature, as well as the specific features and characteristics of the three interactive books specifically examined during the pilot study. The literature, which focuses on the development of literacy and reading comprehension, as well as on issues of multimedia transmission mode, primarily facilitated and made relevant the formulation of hypotheses related to our first and second goals. In addition to the criteria for the studies presenting native interactive books, it was also necessary to focus on aspects that can be applied to the discreetly animated BOOKR Kids software, which therefore adapts more strongly to the educational setting (keeping the number of interactions within limits). In the latter case, our hypotheses are related to the genre specificity of BOOKR Kids books and the current issues of incorporating the software into the educational practice in Hungary.

# RESEARCH METHODS AND SURVEY AREAS

While conducting the pilot study, we collected data using online questionnaires and the teachers' admin interface of the BOOKR Suli software. Before we developed these two digital-based methods of survey data collection, we had prepared sample lesson plans, had developed a trial application to ensure that tools would run smoothly while used by students, and had expanded the research data collection mechanisms in the teachers' admin interface. We developed new versions of the interactive books selected for survey to ensure that the user processes of each can be better compared and thus recorded data for. We not only increased the multimedia components of the stories included in the books (primarily literary material and pictures), but we also restructured the worksheets and increased their page number.
Subclassified according to topic and date, the questionnaires used in the survey (survey instruments) were as follows:

PRE phase (October 2019):
- PRE – profile, all teachers *(Appendix 3)*
- PRE – profile, participating teachers *(Appendix 3)*
- PRE – methodological principles, all teachers *(Appendix 4)*
- PRE – methodological principles, participating teachers *(Appendix 4)*
- PRE – profile, students *(Appendix 5)*

INTRA phase (November – the second week of December 2019):
- Tasks – *Who Ate the Raspberries?,* printed text *(Appendix 6)*
- Tasks – *Who Ate the Raspberries?,* interactive book *(Appendix 6)*
- Tasks – *The Tale of the Green Pig*, printed text *(Appendix 7)*
- Tasks – *The Tale of the Green Pig*, interactive book *(Appendix 7)*
- Tasks – Family circle, interactive book *(Appendix 8)*

POST phase (the third week of December 2019):
- POST – post-event survey experience, all teachers *(Appendix 9)*
- POST – post-event survey experience, all teachers *(Appendix 9)*
- POST – post-event survey experience, students *(Appendix 10)*

The data sets of the PRE phase [64] contained the basic information needed to draw the profiles, as well as prepared the contextualization and interpretation of the data of the POST and INTRA phase. They provided information about teachers' age, the number of years spent in the teaching profession, the parameters of the represented settlements and institutions and classes involved in the survey, as well as their level of ICT awareness. In addition to age, they provided information about students' cognitive abilities and skills, academic achievement in subjects and use of

[64] When developing the criteria of the two questionnaires of the PRE - methodological principles (Appendix 4), we relied on the questions of a research instrument of the study assessing teachers' teaching and assessment methods. Cf. Katalin Radnóti: Milyen oktatási és értékelési módszereket alkalmaznak a pedagógusok? [What teaching and assessment methods are used by teachers?]. – In.: Oktatási Hivatal, https://ofi.oh.gov.hu/milyen-oktatasi-es-ertekelesi-modszereket-alkalmaznak-pedagogusok (Accessed 24.01.2024.)

technology. A separate data sheet assessed teachers' methodological culture, specific teaching methods, frequently used forms of assessment, opinions on the possibilities of differentiated instruction, professional methodological principles, especially the principles of individual practice related to analysing new literary works.

The data set in the INTRA phase provided information on students' decoding process of the three interactive books selected from the BOOKR Suli software. The books were assigned to age groups in accordance with the Curriculum Framework, but prior to their implementation, we allowed each class to try out the so-called *Sample book (Appendix 12)* [65] in the classroom, which helps students to get familiar with the modalities and interactions used in the BOOKR Suli software. In addition, two weeks before the start of the pilot classes, sample lesson plans were given to teachers. The data were, on the one hand, collected by measuring the user adaptation process of one of the compulsory readings, the poem by Ágnes Nemes Nagy *Who Ate the Raspberries*? *(Appendices 13, 14)* with children aged 7–8, on the other hand, that of the tale *I Tell you a Story about the Green Pig* by Béla Horgas with children aged 9–10: *(Appendices 15, 16),* and thirdly the user adaptation of *Family Circle* by János Arany with students aged 11–12 *(Appendices 17, 18)* [66]. The tasks related to the works were developed in accordance with the goals and tasks of the subjects the Hungarian Language and Literature, Visual Culture and Information Technology specified in the Core Curriculum. On the one hand, we collected data about students' language awareness related to interactive book reading, and on the other hand, their reading comprehension performance based on the positive transfer effect. We tried to create relationships between the groups of questions (sets of tasks) by "repeating" certain aspects (specific questions) for each worksheet, i.e. to record data for each of the three interactive books selected in as many cases as possible.

The measurements of the POST survey phase primarily covered teachers' work in the classroom when implementing the interactive book and their related reflections. We allowed for examining teachers' responses in the context of student responses as well (primarily with the enjoyment index for the use of the apps in the classroom).

Prior to the start of the pilot, the teachers' administrative interface allowed only for collecting information about teachers. However, more detailed data recording indicating the partial results was also essential for the research, and therefore the company's programmers expanded the

[65] *Próbakönyv. Ezzel kezdd!* [Sample book. Start with this]. Text: A róka és a holló – The Fox and the Raven – after a fable of La Fontaine, reworked by Ildikó Boldizsár, illustration Ágnes, Bertóthy, number of pages: 9, of which paratextual pages: 3, number of task pages: 1.
Presentation of the Sample book: https://www.youtube.com/watch?v=xhPppHZl77g&feature=youtu.be (Accessed 24.01.2024.)

[66] Nemes Nagy Ágnes*: Ki ette meg a málnát?*, [Who Ate the Raspberries?]. illustration: Krisztina Maros, actress: Tamara Zsigmond, number of pages: 18, of which paratextual pages: 4, number of task pages: 3, Nativity: the interactive book was made on the basis of a printed book (leporello).
Horgas Béla: *Mesélek a Zöld Disznóról*, [The Tale of the Green Pig]. illustration: László Réber, actor: Zsombor Jéger, number of pages: 30, of which paratextual pages: 4, number of task pages: 4, Nativity: the interactive book is native; it has no printed source.
Arany János: *Családi kör*, [Family Circle]. illustration: Ágnes Bertóthy, actress: Kitti Mezei, number of pages: 23, of which paratextual pages: 4, number of task pages: 5, Nativity: the interactive book is native; it has no printed source.
The presentation of the three interactive books included in the surveys is available at the following links:
Ki ette meg a málnát? [Who Ate the Raspberry?]: https://youtu.be/V3UIuyMFyBQ (Accessed 24.01.2024.)
Mesélek a Zöld Disznóról [The Tale of the Green Pig]: https://youtu.be/AXJP1IeuncI(Accessed 24.01.2024.)
Családi kör [Family Circle]: https://youtu.be/mfIwcZ7caPs (Accessed 24.01.2024.)

functions of the teachers' administrative interface, thus allowing for collecting data on the completeon of certain sets of tasks in the application and the content and language quality of the responses. The system also indicated the results and partial results by individual, class and book, and recorded the interactions of the pre-selected book pages.[67] *(Figure 9) (Figure 10).* However, due to the large number of tasks assigned to the three interactive books and the relatively short duration of the pilot period in terms of developments, some of the tasks reached students with a traditional technical solution: the responses given on paper were uploaded by the teachers.

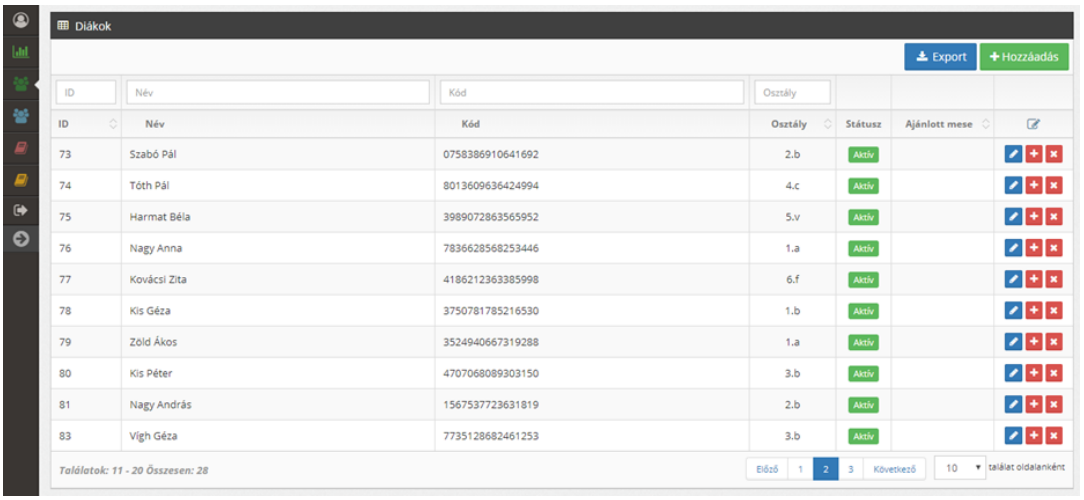


*Figure 9*
Extract from the "teacher administrative" interface of BOOKR Suli that indicates student performance

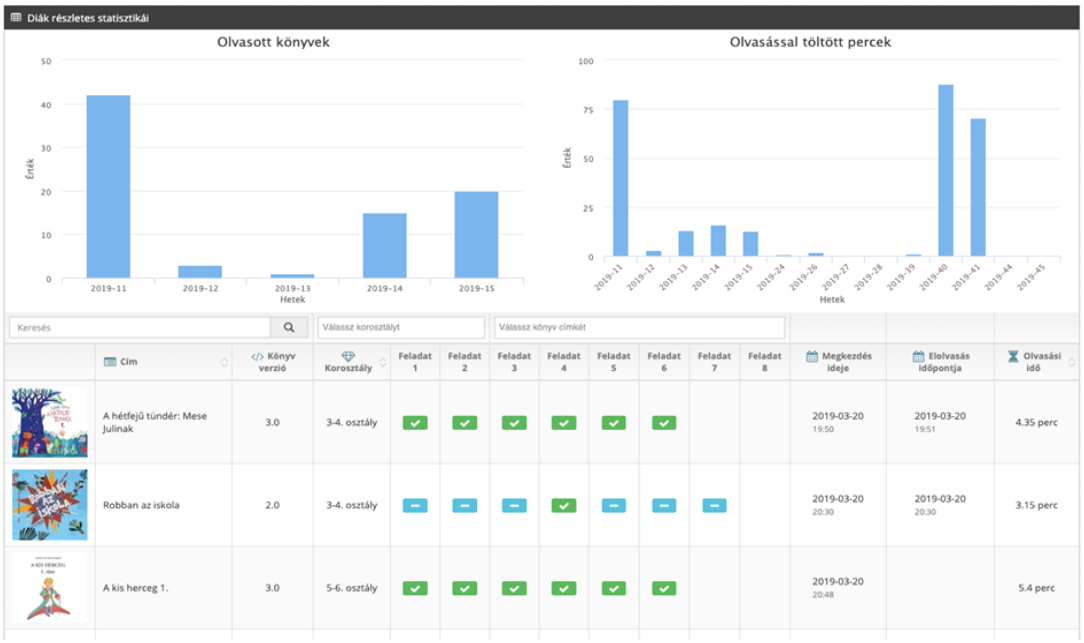


*Figure 10*
Extract from the "teacher administrative" interface of BOOKR Suli
that indicates individual student performance

[67] The following links provide information and user guides about the teacher admin interface. Information video: https://www.youtube.com/watch?v=3k1B53HCv1k (Accessed 24.01.2024.)
User's Guide: https://www.youtube.com/watch?v=LcoczrD3vI4 (Accessed 24.01.2024.)

# PRESENTING THE RESULTS OF THE DEVELOPMENT

In the present chapter of the impact assessment (1) we present, on the one hand, the figures showing the generative effect of the pilot study that can be represented by figures, (2) on the other hand, the results induced by the development of BOOKR books involved in the research, (3) thirdly, the changes that occurred in the pedagogical-methodological approach of the subjects included in the survey as a result of the implementation of the BOOKR software. The figures are presented on the basis of the data collection of the teacher administrative interface as well as the responses to the questions in *Appendices 5-8 and 15-16* collected through paper-based and online questionnaires.

(1) *Developments showing the generative effect of the pilot study that can be represented by figures*

At the beginning of the pilot process, the BOOKR Suli software reached 1,000 students of the 34 public educational institutions maintained by the school district, which was designated by the Klebesberg Centre as the consortium leader of the EFOP-3.2.4 project (see chapter on characteristics of target groups). During the empirical phase of the research (September-November-November 2019), the number of users in these institutions increased significantly: at the end of the data collection process, the number of teachers registered by the software administrative interface was 225 and the number of registered students was 2219. In terms of the number of the software mediators, i.e. the teachers, this is more than six times (661.76%), and in terms of the number of the primary target audience, the users, i.e. the students it indicated a more than twofold (221.90%) increase. From the beginning of the pilot to the end of November 2019, the total number of book downloads made by students (571 downloaders according to the feedback from the system) was 4303, i.e. in the autumn of the 2019-2020 school year, students got familiar with an average of 7-8 books per person (7.50 book/person) within institutional (class) frameworks. The highest download rate was registered at Lajos Kossuth Primary School in Fényeslitke, where 40 students from three classes downloaded a total of 644 books, i.e. an average of 16 books per person (16,01 persons/book). The highest number of interactions (14628 interactions/class, 365,61 interactions/person) was measured in the same institution while the second highest number of interactions was measured in Bogyiszló Primary School, (which was not among the 16 institutions involved in the impact assessment) (11137/class). The number of interactions in September and November was 171,269 for all students in the 16 institutions participating in the impact assessment (*Table 1*). The total reading time of all downloaders (571 students) was 53452 minutes, i.e. an average of 93 minutes per student.

| **Aspects of the study** | **Data of the study** |
|---|---|
| number of registered teachers in all institutions of the pilot study | 225 persons/34 institutions |
| number of registered students in all institutions of the pilot study | 2219 persons/34 institutions |
| the total number of book downloads made by student in the institutions participating in the impact assessment | 4303 downloads/16 institutions |
| the average number of book downloads in all institutions of the pilot study | 268, 94 downloads/34 institutions |

| | |
|---|---|
| the total number of student interactions in the institutions participating in the impact assessment | 171 269 interactions/students of 16 institutions |
| the average of the student interactions in the institutions participating in the impact assessment | 3568,10 interaction/student |

*Table 1*
Numerical indices of the generative effect of the pilot study

(2) *Results induced by the development of BOOKR books involved in the research*

As mentioned above, by reviewing the quality of the three books (*Who Ate the Raspberries?, The Tale of the Green Pig, Family Circle*), BOOKR Kids Ltd. developed their new versions based on our guidelines in order to implement them as efficiently and successfully as possible. These versions were created in order to improve the aesthetic, structural (see interactions) and educational (see worksheets) parameters of the books, as well as to establish the conditions for good testability and modelability (see teacher administrative interface). It can be considered as a result that, for example, we have reshaped *the Family Circle* app in the way of how the characters are portrayed and the relationships between the characters, through which we have created a graphic and animated material that helps students to interpret the text of the poem and fill its "gaps", and at the same time it also serves the goals of education in a more complex way. In all three applications, we increased the number of interactions, but only the interactions for building narratives. In this way, we ensured that students infer the meaning or the message of the text in a more stable way and the conditions for determining the central idea are established by several media at the same time so that the user's attention is focused on the text, picture elements and sound effects that help to create the implied meaning. We have restructured and increased the number of worksheets for the books. Thus the interfaces (sites) that push gamification into the background, but at the same time continue to apply the principle of experiential learning meet more precisely the requirements of the Curriculum Framework in terms of content.

Before starting the data collection, we used the *Sample book* developed during the pilot process, compiled from the details of the BOOKR Kids adaptation, *The Fox and the Raven. The Sample book* allowed students to experience the full spectrum of modalities and to try out each type of interaction. Of the 353 students[68] in the 16 schools participating in the impact assessment, 107 used the *Sample book* for an average of 3.56 minutes. It should be noted and it can be considered as a result that this special application is still available in the BOOKR Suli software and may continue to be an "introductory book" for teaching digital reading in schools.

By developing detailed *sample lesson plans* which take into account the requirements of the Curriculum Framework and at the same time the principles of innovation, we intended to facilitate teachers' delivering classes and standardising the conditions for data collection. We have created one lesson plan for the *Who Ate the Raspberries*? app *(Appendix 19),* two for the book *The Tale of the Green Pig (Appendix 20, 21),* and one for the *Family Circle* adaptation *(Appendix 22),* intended to help teachers to use the interactive book and the printed version in the control groups, respectively, in one class. Presenting the tale *The Tale of the Green Pig* in two lessons was justified by the length of the tale. Students were not familiar with the text of the two interactive books presented in the lower grade classes (the poem by Ágnes Nemes Nagy and the tale by Béla

[68] Of the 353 students, 166 participated in the "interactive book" groups in the empirical research phase, whose tasks included experiencing the modalities of the Test Book. Members of the control group were not given such a task.

Horgas) when the apps were used in class. [69] However, they were familiar with the poem by János Arany because students in certain pilot-institutions had analysed the poem entitled *Family Circle* in "traditional" literature classes even before the measurement processes started: the implementation of the app took place in the framework of a revision lesson.
*Table 2* quantifies the effectiveness of implementing the principles and objectives formulated above and the results of implementation. It presents opinions and responses of the group of 14 persons involved in some phases of the pilot study and those of the 16 teachers involved in every educational task of the impact assessment, both individually and in aggregate (weighted average, expressed as a percentage). The high numerical values which are characteristic of both groups demonstrate high levels of subject satisfaction with the implementation, as well as the positive assessment of the quality of the software and the educational opportunities it offers. In addition, the responses of teachers who actively participated in the impact assessment and tried out the possibilities offered by the software more widely and in a more diverse manner suggest that they showed higher levels of satisfaction than teachers who use BOOKR Suli software to a more limited extent.

83.35% of the subjects were satisfied with the number of software interactions and 76.86% with the variety of interaction modalities as well. 36.67% believed that the software helps students to find and determine the central idea of literary texts similarly to a book in print form, and 63.38% believe that it helps them even better than a book in traditional print. The *Sample book* application was used in class by the 16 teachers involved in the impact assessment, who said that this development significantly helped them to prepare their digital reading classes (43.8% of the respondents said that the *Sample book* facilitated the performance of all students and 43.8% said that it facilitated that of the majority of students).

| **Questions** | **The response rates from the 14 teachers participating in the pilot study** | **The response rates from the 16 teachers involved in the impact assessment** | **The aggregation rates** |
|---|---|---|---|
| **What do you think about the number of interactions in the interactive book that you used in the pilot lesson?** [70] | | | |
| there are many interactions | 0,00 | 0,00 | 0,00 |
| there are few interactions | 14,30 | 0,00 | 6,67 |
| there are sufficient interactions | 71,40 | 93,80 | **83,35** |
| I cannot judge it | 14,30 | 6,30 | 10,03 |
| **What do you think about the type of interactions, i.e. the variety of modalities?** | | | |

[69] The lesson plans developed for the implementation of the three applications in the Hungarian language and literature classes also facilitated teaching the printed text used by the control group. The lesson plan created for the interactive book *Who Ate the Raspberries?,* which we supplemented with questions in Appendix 6, is also publicly available on the website of BOOKR Kids Ltd. via the link below
https://bookrsuli.hu/docs/oravazlat_kiettemeg.pdf (Accessed 24.01.2024.)
[70] It is a question that allowed multiple answers.

| | | | |
|---|---|---|---|
| there is a wide variety in modalities | 7,10 | 12,50 | 9,98 |
| there are few modalities | 0,00 | 6,30 | 3,36 |
| there are sufficient modalities | 78,6 | 75,00 | **76,68** |
| I cannot judge it | 14,30 | 6,30 | 10,03 |
| **To what extent do you think the series of interactions of BOOKR Suli books serve the purposes of teaching and learning and gaming experience?** (1= mostly the purposes of teaching and learning, 5= mostly the purposes of games) | | | |
| 5 | 0,00 | 0,00 | 0,00 |
| 4 | 14,30 | 6,30 | 10,03 |
| 3 | 71,40 | 62,50 | **66,65** |
| 2 | 0,00 | 31,30 | **16,69** |
| 1 | 14,30 | 0,00 | 6,67 |
| **To what extent do you think the tasks at the end of the BOOKR Suli books serve the purposes of teaching and learning and gaming? (1 =** mostly the purposes of learning and learning goals, 5 = mostly the purposes of games) | | | |
| 5 | 0,00 | 0,00 | 0,00 |
| 4 | 42,90 | 0,00 | 20,02 |
| 3 | 35,70 | 50,00 | **43,33** |
| 2 | 21,40 | 37,50 | **29,99** |
| 1 | 0,00 | 12,50 | 6,67 |
| **Do you think interactive book help students to determine the central idea of the text?** | | | |
| as much as a printed book | 57,10 | 18,80 | **36,67** |
| better than a printed book | 42,90 | 81,30 | **63,38** |
| less than a printed book | 0,00 | 0,00 | 0,00 |
| **Did the experience gained with the interactions of the trial application ensure the smooth use of the application in the pilot class?** | | | |
| mostly yes | not relevant | 43,80 | **43,80** |
| for some persons yes | not relevant | 12,50 | 12,50 |
| for some persons no | not relevant | 0,00 | 0,00 |
| it was not enough for anyone | not relevant | 0,00 | 0,00 |
| it was enough for everyone | not relevant | 43,80 | **43,80** |

*Table 2*
Results induced by the development of the three BOOKR-books

In addition to the above, another result of the software development is that a more proportionate data collection system for the worksheets of the books was developed, which provides more favourable conditions for research. It allowed for measuring the sub-tasks of the books one by one and recording the number of attempts made to complete the task per sub-task.

The excel spreadsheet summarizing the number of tasks, the number of sub-tasks, the results, the number of bad attempts and the utilization of modalities (the extent to which students recognise the places for interaction), measuring the performance of the 16 institutions participating in the

impact assessment, – from which the data can be obtained by school, class, student and book, – contains 88370 lines. The aggregation of all students in all schools participating in the pilot study records the information listed above in 172614 lines.

(3) *Changes in the pedagogical-methodological approach of the participants in the pilot study as a result of the implementation of the BOOKR software*

Here the data of the data sheets of the PRE phase, i.e. the questionnaires entitled Profile – all teachers, Profile – participating teachers, Methodological principles – all teachers, Methodological principles – participating teachers, Profile – students *(Appendix 3-5)* are compared with the relevant data of the data sheets of the POST phase, i.e. the questionnaires entitled POST – post-measurement experience, all teachers, POST – post-measurement experience, participating teachers and POST – post-measurement experience, students *(Appendix 9-10)*. Due to their structural correspondences, the questionnaires used in the empirical research process and listed above, allow for the numerical presentation of the three-month data collection phase of the pilot study in a diachronic manner, i.e. the presentation of the results of the development/change compared to the beginning of the process. The other group of the questionnaires is synchronic, thus its data groups (results) allow for a focused assessment in relation to the goals and hypotheses (see the chapter on evaluating the results of the development).

The diachronic (relative) values are detailed in Table 3. The data show that at the start of the empirical research process, a significant percentage of teachers participating in the pilot study (26.90%) had "mixed feeling" about the task of implementing BOOKR Suli software. After their trying out the software, this number decreased significantly (6.67% of subjects voted for the mean value indicated by point 3 on a five-point scale). With very few exceptions (6.67%), everyone was motivated to try out the application in their classes. Overall, 70.05% of the respondents, by their own admission, had no dificulties incorporating interactive books into the classroom. In the case of the 16 teachers who used the sample lesson plan in their lessons, this proportion was even higher, 93.80%.

Regarding the media and cultural characteristics of interactive book reading, the survey participants had an outstandingly positive opinion in terms of the following. On the one hand, in their view, interactive books provide an opportunity for teachers to take into account the differences in students' abilities in class. 74.58% of teachers who generally considered differentiation to be important (86.25%, indicated by 4-5 on a five-point scale) stated that this goal could be achieved through the use of the software. On the other hand, in their view, the new form of transmission of literary works is also suitable for reducing socioeconomic and sociocultural disadvantages. (While Hungarian language and literature classes delivered in the "traditional" way were rated as moderate by 66.70% of teachers in this respect, 26.68% rated lessons using interactive books as "good" by and 26.67% as "excellent"). Thirdly, the data show that teachers can imagine the utilization of the visual material (still images!) in interactive books covering a broader spectrum in the future than they can in the case of printed books. (In particular, 79.99% of teachers rated the beneficial effects of pictures on students' creativity as good.)

| Questions before data collection | Questions after data collection | The response rates from the 14 teachers participating in the pilot study | The response rates from the 16 teachers involved in the impact assessment | The aggregation rates |
|---|---|---|---|---|
| **How did you feel about the information that you would have the opportunity to use digital books in your classes?** [71] | | | | |
| I was happy about it | | 11,80 | 69,20 | **42,41** |
| I was curious about it | | 58,80 | 69,20 | **64,35** |
| I had mixed feeling | | 47,10 | 7,70 | 26,09 |
| I had an aversion to it | | 17,60 | 0,00 | 8,21 |
| I was not happy at all | | 0,00 | 0,00 | 0,00 |
| | **Were you motivated to use an interactive book in your classes?** [72] (1=no, 5= very much) | | | |
| | 5 | 50,00 | 62,50 | **56,67** |
| | 4 | 35,70 | 37,50 | **36,66** |
| | 3 | 14,30 | 0,00 | 6,67 |
| | 2 | 0,00 | 0,00 | 0,00 |
| | 1 | 0,00 | 0,00 | 0,00 |
| | **Did you have any difficulties incorporating interactive books into your classes during the pilot study?** (1=no, 5=very much) | | | |
| | 5 | 14,30 | 0,00 | 6,67 |
| | 4 | 21,40 | 6,30 | 13,35 |
| | 3 | 21,40 | 0,00 | 9,99 |
| | 2 | 0,00 | 0,00 | 0,00 |
| | 1 | 42,90 | **93,80** | **70,05** |

[71] It is a question that allowed multiple answers.
[72] It is a question that allowed multiple answers.

| | | | | |
|---|---|---|---|---|
| | **Based on your experience so far, would you have any difficulties in the methodological-theoretical integration of interactive books into your classroom in the future (i.e. preparing lesson plans similar to the sample lessons plans)?** (1=no, 5=very much) | | | |
| | 5 | 21,40 | 0,00 | 9,99 |
| | 4 | 14,30 | 0,00 | 6,67 |
| | 3 | 0,00 | 12,50 | 6,67 |
| | 2 | 14,30 | 12,50 | 13,34 |
| | 1 | 50,00 | 75,00 | **63,33** |
| **Do you consider the implementation of differentiated instruction in the classroom to be a good method?** (1=no, 5=very much) | | | | |
| 5 | | 46,70 | 46,70 | **46,70** |
| 4 | | 46,70 | 33,30 | **39,55** |
| 3 | | 6,70 | 20,00 | 13,79 |
| 2 | | 0,00 | 0,00 | 0,00 |
| 1 | | 0,00 | 0,00 | 0,00 |
| | **Do you think that the BOOKR Suli software is suitable for differentiating between children with different abilities and different learning pace?** | | | |
| | yes | 74,10 | 75,00 | **74,58** |
| | no | 0,00 | 0,00 | 0,00 |
| | I cannot judge it | 21,40 | 25,00 | 23,32 |
| **Do you think that any of the methods used in teaching Hungarian language and literature can reduce the socio-economic and socio-cultural disadvantages in the learning community?** (1=no, 5=considerably) | | | | |
| 5 | | 0,00 | 6,70 | 3,57 |
| 4 | | 20,00 | 20,00 | **20,00** |
| 3 | | 66,70 | 66,70 | **66,70** |
| 2 | | 13,30 | 0,00 | 6,21 |
| 1 | | 0,00 | 0,00 | 0,00 |

| | | | | |
|---|---|---|---|---|
| | **Do you think that using the BOOKR Suli apps can reduce the socio-economic and socio-cultural disadvantages in the learning community?** (1=no, 5=considerably) | | | |
| | 5 | 14,30 | 37,50 | **26,67** |
| | 4 | 28,60 | 25,00 | **26,68** |
| | 3 | 50,00 | 31,30 | **40,03** |
| | 2 | 0,00 | 0,00 | 0,00 |
| | 1 | 7,10 | 6,30 | 6,67 |
| **Do you use the pictures and illustrations of the textbooks and illustrations in the Hungarian language and literature classes?** [73] | | | | |
| no, because the illustrations in the textbook are usually weak | | 6,70 | 0,00 | 3,13 |
| no, because I focus on the text | | 0,00 | 0,00 | 0,00 |
| no, because talking about the picture distracts children's attention away from the text | | 0,00 | 0,00 | 0,00 |
| no, because this task usually fails | | 0,00 | 0,00 | 0,00 |
| no | | 0,00 | 0,00 | 0,00 |
| sometimes | | 13,30 | 6,70 | 9,78 |
| often, because it provides methodological diversity | | 33,30 | 40,00 | **36,87** |
| often, because it makes it easier for children to imagine what they have learned | | 20,00 | **73,30** | **48,43** |
| yes, because it inspires children | | 33,30 | 60,00 | **47,54** |
| always | | 6,70 | 20,00 | 13,79 |
| | **Do you plan to use the pictures and illustrations of the BOOKR Suli's interactive books in your Hungarian language and literature classes in the future?** [74] | | | |
| | no, because the illustrations in the textbook are usually weak | 0,00 | 0,00 | 0,00 |

[73] It is a question that allowed multiple answers.
[74] It is a question that allowed multiple answers.

| | | | | |
|---|---|---|---|---|
| | no, because I focus on the text | 0,00 | 0,00 | 0,00 |
| | no, because talking about the picture distracts children's attention away from the text | 0,00 | 0,00 | 0,00 |
| | no, because this task usually fails | 0,00 | 0,00 | 0,00 |
| | no | 0,00 | 0,00 | 0,00 |
| | sometimes | 50,00 | 12,50 | 30,00 |
| | often, because it provides methodological diversity | 35,70 | 68,60 | **53,25** |
| | often because it makes it easier for children to imagine what they have learned | 7,10 | 62,50 | **36,65** |
| | yes, because it inspires children | 71,40 | **87,50** | **79,99** |
| | always | 0,00 | 12,50 | 6,67 |

*Table 3*

Data showing the impact of the implementation of the BOOKR Suli software

# EVALUATING THE RESULTS OF THE DEVELOPMENT

The hypotheses formulated in the chapter on Hypotheses and indicated as "synchronic" above, are listed again with numbers and verified item by item below.

## 1.1. We hypothesize that interactive books foster word-level knowledge more

One reason for poor reading is limited and inadequate vocabulary. Understanding less commonly used words is poor. Our hypothesis is that the use of an interactive book, the possibilities of interaction, and the various modalities support the process by which students retrieve the meaning of a word from an interpretive background. We suppose that the reason for this is basically the fact that interactive applications can help students create mental images by allowing for combining perceptual information and semantic information in a complex media environment. Of the levels of linguistic organization, the research links the events of lexical, semantic, and syntactic enrichment to the level of words.

Thus, we developed our hypothesis on the finding is that interactive books provide students with a natural, life-like, constructive way of learning and enriching vocabulary through interactions and modalities. In this case, reading is both an interactive and reflective process in the concrete and figurative sense of the word,[75] during which students actively construct meaning. In addition to words, the so-called figurative language is also to be classified into this intermediate level of language proficiency. At this profiency level, we measured the impact of interactive books on the reading process in the following tasks:

### 1.1.1. Survey results of the *Who Ate the Raspberries?* app

Our hypothesis was verified by the synchronic analysis of the poem *Who Ate the Raspberries?* by Ágnes Nemes Nagy, data were collected on children aged 8–9 years. Students' reading comprehension skills at this intermediate proficiency level were measured by incorporating two tasks into text analysis lessons.

In Task 11 in *Appendix 6* students had to complete the sentences with one word in each gap. Correct selection of the target word was facilitated by the object pictures from the application (e.g. the picture of a raspberry) by activating children's knowledge about reality. They reinforced the verbal stimulus, which the strong context might also have evoked as the sentences were quotes from the text of the poem. In addition to the visual stimulus, the rhythm and auditory memory as well as the mood of the poem also helped students to complete the task. Students' approach to meaning in poems is also defined by their emotions. This medial context was reinforced by object pictures.

In all subtasks of Task 11, students using the interactive book performed better. The proportion of good answers in this group was twice as high as for the first sub-task, six times as high as for the second, five times as high as for the third, and three times as high as the proportion of those

[75] Bárdossy Ildikó – Dudás Margit – Pethőné Nagy Csilla – Priskinné Rizner Erika: A kritikai gondolkodás fejlesztése. Az interaktív és reflektív tanulás lehetőségei. Tanulási segédlet pedagógusok és pedagógusjelöltek számára a saját élményű tanuláshoz. [Developing Critical Thinking. Opportunities for Interactive and Reflective Learning. A Learning Guide for Teachers and Teacher Trainees for Self-directed Learning]. Pécs-Budapest. University of Pécs, 2002. http://pedtamop412b.pte.hu/files/tiny_mce/File/KG1.pdf (Accessed 24.01.2024.)

using the printed text. We assume that a further reason for the tripling of performance is that children's fine motor skills needed to perform the task improved, and they got the hang of the way of how to perform the pulling movement.

In Task 12, those using the printed text were more effective in text analysis: their performance per sub-task was 80%, 93%, 100% while the performance of those using the interactive book was 26, 67%, 26.67 % and 46.67%. The reason for the more effective performance of the control group using the printed book was presumably that this group had to update the meaning in the time available only in relation to the thing and the word form as it had to do when analysing the poem. Compared to this operation, the group using the interactive book had to perform several substitution operations in a three-way relationship (word form – illustration – meaning).
Tasks 19 and 20 of *Appendix 6* focused on interpreting the so called figurative language. The task is appropriate for measuring the effectiveness of reading comprehension skills because in order to follow the movement of meaning shifts and to create interpretation, students had to be able to move confidently throughout the text.
In interpreting the statement, *"The pine forest doesn't hide those who have sticky fingers"* students using the interactive book provided several evaluable answers, but neither group was able to perform the task completely well. Only 9% of those using the printed book and only 11% of those using the interactive book interpreted the term as meaning the same as the word 'steal'.The reason for this may be that this statement is a linguistic metaphor for one of the thematic, thought focuses of the story. The fact that the application has a visual reference to this content may have helped the group using the interactive book. The eucatastrophe at the very end of the story, i.e. the logic unfolding in the sequentiality of the narrative, could have helped both groups equally in creating the more abstract meaning of the term. The other layers of semiosis, on the other hand, did not significantly support meaning making in this case.
The figure of speech *"the pine forest doesn't hide it ..."* (lithotes) serves as one of the weakened linguistic expressions of telling the truth, an intermediate stage leading to ironic statements. Thus it is about a language form that requires a thinking operation, which is still difficult to read and understand at the age of 8–9. Illustrating it would also go beyond the visual interpretive ability of children aged 8–9 as it is basically a thought form. Thus, it is easy to understand why the proportion of those who gave the correct answer was low in both groups. In relation to the expression "*beat the bushes*" students were supposed to give the meaning of the literary device with colloquial metaphors. The results of the survey were as follows: 6% of those using the printed text and 8% of those using the interactive book interpreted the expression correctly.

Apparently, a higher percentage of students using the interactive book performed the task well although this event is also unmarked at the visual level in the application. The linguistic image indicates a single narrative event. According to the plot, the bear-cubs search for the missing raspberries everywhere in the forest while at the same time they visit some forest animals in the tale. The object to which the action is directed is present in the illustration. Thus the lexical field of 'search' as an action becomes more emphasized and its semantic boundaries are strengthened by the visible pictorial reference. In contrast, meaning stabilization may have been difficult for children using the printed text because the word denoting action in the expression "*beat the bushes*" facilitated students' reading comprehension only on a syntactic and not semantic level.

### 1.1.2. Survey results of the *The Tale of the Green Pig* app

Our hypothesis was verified by synchronic data collection on students aged 10 analysing the tale *The Tale of the Green Pig* by Béla Horgas. In the task that allowed for data collection, students had to construct meaning at the word level. Tasks 6 and 7 in *Appendix 7* are similar in content. In each case, selection of the good answer depended on students' ability to identify semantic relationships associated with naming. Both the group using the interactive book and the one using the printed text performed similarly and the results were convincing.
In Task 6, students had to select a metaphor denoting the exceptional ability of the Spiny Pig. In both groups, the proportion of those who gave a correct answer was convincing (72.9% of those using the printed text, 79.3% of those using the interactive book). The reason for this may be that the literary description helped students to identify the "trickster" metaphor. In the case of the two incorrect answers, the answers of the group using the printed text show a higher error rate. We hypothesize that it is due to the fact that while reading/listening to the descriptive part that helps to construct the metaphor in the interactive book, students can follow the Spiny Pig illustration for a long time on the screen. Its movement is accompanied by iterative music. The modalities that mobilized the mechanisms of representation affected vision and hearing simultaneously. Students had time (!) to linger over the picture of the Spiny Pig ambling to the Wild Boar. Like films interactive books are also a shifting formation, but in the latter, still the process of contemplation means a much more homogeneous task.

In Task 7, 51.7% of students using the printed text selected the correct answer compared to 50% of students using the interactive book, i.e. half of the students marked the Blue Pig correctly. This balance in the performance of the two groups may be due to the fact that the text makes the origin of the nickname of the Blue Pig tangible (real) with its experiential literary description through long lines, i.e. the contextual embeddedness of the Wild Boar name is strong. In both tasks selection of the correct answer depended on recognising the content relationship between the name and its wearer.

In Task 21 of the worksheet, students had to create meaning using the context (putting the word in a sentence). The productivity of students using the interactive book gradually increased from sub-task to sub-task (21.88%; 34.92%; 42.86%; 58.73%; 69.84%) while the productivity of those using the printed text gradually decreased. In our view, the reason for the increasing performance of students using the interactive book is that interactions helped to interpret the "colour-game", which can be considered to be the whole point of the story, to identify meaning. This is because the students had the opportunity to bring about changes in state in an interactive way. The comprehension process became productive, in which the internal meaning-construction process played a prominent role. In our view, the interactive hybrid environment facilitated the psychic component systems of reading skills.[76]

### 1.1.3. Survey results of the *Family Circle* app

In the pilot process the analysis of the poem *Family Circle* by János Arany through interactive books provided an opportunity to assess the plausibility of our hypothesis about word-level language development. The survey was conducted as an analysis of synchronic context with diachronic relevance since students had already got familiar with the text a year earlier.

[76] Dr. Tóth László: Az olvasás pszichológiai alapjai. [Psychological Foundations of Reading]. Pedellus, 2002.

Word-level language proficiency was measured with two different types of tasks. One of them was interpreting the literary language version of figurative language, the metaphor of *"the young girl... a morning star"*. Task 7 in *Appendix 8* was performed correctly by 73.2% of students. The rate of those who gave the correct answer is convincing. This may be due to the fact mentioned above that students had already got familiar with the text in the previous school year, and they had also developed metaphor interpretation strategies. The application did not facilitate the selection of the target answer in this case as, on the one hand, the graphic designer has not yet been able to visually distinguish between the two female figures in the poem, and on the other hand, *"the young girl"* appears only with her back in the illustration. In the pilot process, the developers only just started improving the configurations of the *Family Circle* app.
The other task that allowed for measuring word-level language proficiency was the so-called associative task.

The results show that despite the fact that the text was analysed with the use of interactive books, only slightly more than half of the students performed well. We assume that the reason for the modest result is that students rarely read descriptive texts in poetic form, as a result of which it is difficult for them to break it down into parts. We tried to facilitate students' ability to understand semantic relationships between words by generating sound and movement effects due to the changes made in the pilot process. In our experience, the media richness of interactive books would facilitate the development of students' cognitive and language skills which are needed to understand the story, the narrative structure, and the narrative itself, and it is of particularly importance in the case of the compulsory reading lists.

## 1.2. We hypothesize that due to their media richness interactive books foster syllable-based reading at word-, sentence- and text level that lays the foundations for reading comprehension

Reading at word, sentence and text levels that lays the foundations for reading comprehension also depends on the level and quality of students' general and partial logical thinking skills. For this reason, it is justified that at least until children reach the age of 9, while developing comprehension skills, teachers should place great emphasis on meaning making at language levels creating texts as well. Accordingly, during the survey in a significant portion of the tasks children were required to work with sentences, blocks of sentences, or paragraphs, and in a smaller portion with short texts. The segmentation tasks requiring visual analysis skills can improve routine word identification skills, which leads to skillful reading comprehension. Segmentation tasks improve visual analysis, as well as visual word recognition skills. On the other hand, in terms of cognitive skills, visual-semantic-syntactic segmenting skills, which lay the foundation for reading comprehension skills, ensure the recognition of part-whole relations, and also result in the improvement of analytical and synthetic skills. Each of the two applications developed for students aged 6–9 in the pilot study includes a type of tasks that develops syllable-based reading skills and allows for measurement.

In the case of the *Who Ate the Raspberries?* app Task 1-2 in *Appendix 6* allowed for measuring segmentation skills. When performing task 1, the control group using printed books produced better result compared to the 60% performance of group using interactive books; only 53% of students were able to correctly divide the text into verse lines. In Task 2, the group using printed

books also performed better when dividing the text into verse lines. Thus our hypothesis was overturned in view of the measurement results. We hypothesize that this is due to the novelty of using the digital device in the classroom.

In the case of *The Tale of the Green Pig,* the content of Task 1 in *Appendix 7* is the same as the segmentation task presented above. In this case, compared to 15.8% of the students in the control group, 20% of those using the interactive book completed the task correctly. In this case, too, the lower proportion of those who performed well can be explained by the novelty and media richness of the tool.
Task 11 in *Appendix 7* provided us the opportunity to implicitly observe how students use their segmentating skills by measuring their ability to orient themselves within the text. The results demonstrated that the task performance of the group using interactive books was 58.8%, just a little more, compared to the 53.8% of the group using printed books. Thus the digital environment did not indicate a significant difference in students' performance in the control group and in the group using interactive books, i.e. we could not confirm our hypothesis in the case of this application, either.

## 1.3. We hypothesize that through animations and interactions interactive books facilitate and stabilize meaning identification

Our hypothesis is based on the insight that the multimodal nature of interactive books and the mutual configurational relationships of motivators provide students with physical and sensory experiences. The goal of the various modalities is not only semantic representation, but also to evoke various moods and emotions and to provide joyful experiences.[77] And readers "are not passive recipients, they do not simply understand, but actively create and construct meaning, namely on the basis of their existing knowledge and experience: i.e. meaning is the result of the cooperation and interactions of text and reader. The task of making meaning is multiplied by the media environment.[78] Thus reading visual narratives becomes an exploitable opportunity to improve student performance in the digital environment. Task 15 in *Appendix 7* allowed us to confirm or refute our hypothesis. In fact, the task focused on one of the most powerful novelties of the digital environment: recognizing the relationship between image and text. A good answer was given by 70.9% of those using interactive books compared to 51.7% of those using the printed text. In the case of Task 2 of *The Tale of the Green Pig* app, the students who selected the correct answer were always in the group using interactive books. The rate of those who chose the correct answer within the group compared to the total number of respondents: 92.54%, 100%, 60.29%, 70.59% and 31.15%.

[77] For more details on this topic, see: Grodal, Torben: Történetek szemnek, fülnek és izmoknak. Videójátékok, médium, megtestesült tapasztalás. [Stories for Eyes, Ears and Muscles. Video Games, Medium, Embodied Experience]. – In.: Narratívák 7. Elbeszélés, játék és szimuláció a digitális médiában. [Narratives 7. Narration, Play and Simulation in Digital Media]. / eds.: Thomka Beáta – Fenyvesi Kristóf – Kiss Miklós – Bp.: Kijárat Kiadó, 2008. p. 226–257.
[78] Tóth Beatrix: A szövegértés fejlesztésének elmélete és gyakorlata. [Theory and Practice of Developing Reading Comprehension]. – In.: Magyar Nyelvőr, 2006. 4. sz. p. 457–469.
http://www.c3.hu/~nyelvor/period/1304/130406.pdf (Accessed 24.01.2024.)

## 1.4. Interactive books result in better performance in understanding time-space relationship

According to our hypothesis, interactive book reading helps students to recognise visual and non-visual information and formal qualities, to recognise and interpret sight and identify meaning on the basis of these. It develops students' abilities to interpret perspectives, facilitates focusing their attention on image formation and improves their spatial visualisation skills. In terms of reading comprehension skills, all this is (also) important because narratives represent temporal processes, and in this process they bring about changes in various states.

We assigned the following measurement data to our hypothesis: The answer to one of the questions in the task in *Appendix 6* "Why can only the head of the bear-cub be seen in the picture?" that was selected by a large percentage of students (in the group using the printed text: 40%, the group using the interactive book) was: because it did not fit the picture entirely due to its size. Option "b" – "Because we see the animals too closely" – was also chosen by many, similarly to the previous proportion (the group using interactiver books: 40%, the group using printed books: 33.3%). The ratio of the answers compared to the total number of respondents indicates that students' spatial visualization, sight recognition and interpretation was guided by the pictures they saw.

Student responses to tasks related to perspective perception and image interpretation *(Appendix 7)* confirm our hypothesis that well-structured pictures develop students' image segmentation, image recognition and analysis skills. A higher percentage (53.4%, 20.7%, 8.6%) of the answers selected by students using interactive books for the question "Observe the picture carefully and answer the following question: is it true that we can see only the face of the first robber in this picture?" indicated that they performed the required operations, compared to the answers selected by the group of students using the printed text and still images.

## 2.1. Interactive books allow for recognizing and decoding the relationships between different media

In accordance with the Curriculum Framework, the condition for recognizing the relationships between the various media is the knowledge of the concepts of text, image and sound, as well as the experience of their modes of appearance. The interactive books of BOOKR Suli are suitable for establishing these conditions, i.e. both for allowing students' getting (making students) familiar with and allowing for their gaining (making them gain) experience with the listed media components and their modes through digital media. It should be noted that the *Sample book*, which students had used before reading the BOOKR Suli books based on the surveys, "exemplifies" certain modes and the knowledge related to the technical and semantic "traffic" between modes in a structured way.

The parallelism of the linguistic and visual media, i.e. the "double coding" that facilitates meaning making, is more characteristic of the books of BOOKR Suli than the differences between them. However, the statement made in Hypothesis (2)1, according to which *the application allows for recognising and decoding the relationships between various media* can be measured primarily through the latter type of relationship. It means that in cases where what the still or moving image expresses does not fully cover what the sopen or audible text or effect "states". While we were measuring

the effect of *Who Ate the Raspberries*? and *I Tell you a Story about the Green Pig,* based on this medial difference, the task students had to perform was in both groups that they had to compare the content of a given part of the text with the content of some still images ("freezing" the essential details of the movement sequence of the given book page) (*Appendix 6, Task 17, Appendix 7, Task 15.)*

In the case of the tale *The Tale of the Green Pig* the number of correct answers was almost 20% higher in the group using interactive books (70.90%) than in the control group (51.70%). This was presumably due to the fact that the group using interactive books was able to observe the story expressed in pictures while reading/listening to the application, i.e. before seeing the worksheet illustrations unlike the group using printed books. On the other hand, they were familiar with the movement process belonging to the given text part, and thus, they associated the "cut-outs" (as pre-knowledge elements) with the text meaning better. The measurements related to the *Who Ate the Raspberries?* app in terms of decoding the moving image information and relationships also produced more favourable results for group A. However, it should be noted that just over half of students gave correct answers in both groups (the group using interactive books: 50%, the group using printed books 53.3%). The former group performed better (8.3%) than the latter (6.7%) only in the subtask where the images could be decoded correctly only by extension (i.e., the rolling raspberries indicated that Thief Ferke's basket was overturned, but the thief was not visible in the picture) (*Appendix 6,* Task 17). It is true that the text also allows for extension by imagination, yet the results show that if the text is accompanied by a series of pictures during reading, extension, i.e. the inference and understanding of time and causal relations becomes easier later and it can be mobilized as pre-knowledge.[79]

## 2.2. Interactive books facilitate students in formulating the central idea of the text, which lays the foundations for literal and interpretive reading

Interactive books can help students to formulate the central idea, i.e. to reconstruct the theme of the story, which lays the foundations for literal and interpretive reading, with both the parallelism of the channels and the differences between media and interactions. During the survey of *Who Ate the Raspberries?*, this statement was confirmed as follows: To the question, "What is the poem about?" (*Appendix 6*, Task 18), more than 70% of the subjects in both groups selected the correct answer and they did not mark the one of the two false answers that differed significantly from the correct one as true, but they were not able to recognise the smaller difference between them to the same extent. Those who used interactive books performed better (81.80%) than those who used only the printed text (73.30%). The reason for the 8.50% difference is, presumably, that the application highlights the role of cub-bears in the dialogue at the beginning of the story through movement and interactions, so it was clearer to the students of the group using interactive books that it was not the bear mother who asked the bear-cubs to pick raspberries (see false answer) but it was them who decided to do so (see correct answer).

The indirect aim of the question "Who do you think the protagonist of the story is and why?", which we asked in relation to the tale *The Tale of the Green Pig* was to get students to identify the central idea of the tale (*Appendix 7,* Task 23). There were no significant qualitative differences

[79] When conducting survey on the use of *Who Ate the Raspberries?* app, we were able to collect data only from 12–15 (a total of 27) students and thus the generalizability of our results is limited.

between the responses of the two groups in terms of language and content. However, the responses of the group using interactive books based on their understanding the central idea of the story seemed to have a wider content spectrum than those of Group B (also based on their understanding the central idea of the story) and their identification with the hero seemed to have been affected by empathy. 7 students in the group using interactive books chose the Green Pig because this character suffered a loss as "he was kidnapped". It should also be noted that in the group using interactive groups there were more responses indicating that students recognized the significance of the relationship between the title and the whole text (4 students) than in the group using printed books (1 student) (For example: "the Green Pig is the protagonist because he is in the title"). Overall, it can be concluded that the opportunities provided for the identification with the hero through interactions are supposed to have positively contributed to the successful attempts to formulate the central idea. In the case of the character of the Green Pig there were more such opportunities than in the case of the Blue Pig (cf. e.g. colouring the pig, triggering the associated sound effects and moving it along with touch drag/ swipe).

## 2.3. Interactive books can also lay the foundations for metacognitive knowledge

As we had the opportunity to record data once during the pilot study, students' metacognitive knowledge related to interactive books (*Family Circle*) and its use could only be observed and measured at the current, i.e. "beginner" stage. Athough the *Sample book* also provided students with structured experience, we could record data about "knowledge about knowledge and knowledge related to its operation" and "control over the operation of own knowledge" primarily synchronically[80] and only to a limited extent diachronically.[81] Synchronic data provide information on self-reflexive knowledge related to the management of the interactive interface, while (to a limited extent) diachronic data also provide information on self-regulatory mechanisms exhibited by students while completing a task. The latter could be collected by a special measurement method of the software administrative interface.

### 2.3.1. Synchronic data

To explore if self-reflexive knowledge associated with managing the interactive interface operates, we asked questions using the following phrases: "What interactions do you think contributed to the *creation* of the atmosphere and the mood of the poem?", "What interactions *helped you* while you were reading the poem?" (*Appendix 8*, Task 13-15). 72-75% of the responses showed that students understood the concept of interactive elements and applied them properly; within this, a smaller percentage of them (23-25%) named the given interaction with an abstract concept (image, animation, sound, movement and "the interactive function of the image"), a higher

[80] The attribute 'to a limited extent' here indicates that there is a very short distance between the two time phases, and it is hardly possible to separate the two and compare the results associated with them. When measuring the user process of the *Family Circle*, we had to separate the two time phases within one lesson: the first work process (gaining user experience) at the beginning of the lesson was related to reading the *Sample book*, and the second, just a few minutes later, was related to reading the *Family Circle* application.

[81] For J. H. Flawell and a summary of researchers' views on students' metacognitive knowledge, see Tarkó Klára: Az olvasás és a metakogníció kapcsolata iskolás korban. [The Relationship between Reading and Metacognition in School-aged Children]. Magyar Pedagógia, 1999. Vol. 99. No. 2. p. 175–191.
http://www.magyarpedagogia.hu/document/Tarko_MP992.pdf (Accessed 24.01.2024.)

percentage of them (75-77%) presented them through examples (e.g. "flashing blue", "sad music" and "the app shows the meaning of the new word on the animal"). On average, 10% of our subjects misunderstood the questions, and a further 15-18% did not answer the questions.[82]

At the same time, the majority (88-90%) of the answers were related to the mood of the poem and not to its *creation* (which also assumes user manipulation): students thus typically did not separate the interaction as such, which is part of the learning and reading process (e.g. how to fill a pipe) from the interaction (the sound, visual elements, e.g. how a pipe smokes). Overall, we concluded that only 8-10% of our subjects possessed knowledge about their own perception and cognition. In the latter case, the typical responses were as follows. (1) "As I saw the picture, I could imagine it." "I was able to put myself into the story on the basis of the pictures and sounds." "The cow is being milked and the milk can be delivered and poured into a bucket." "It's interactive; when we touch it, – sound effects, animation, text tracking – they help you to experience it and to imagine the poem." (*Appendix 8*, Tasks 13, 15). (2) "Moving his hands and his smoking a pipe helped." "It helped that she (the actor) read it, that it could be touched, that the farmer got sweaty and his hands are moving and he is smoking his pipe, you can make wrinkles appear on his forehead." (*Appendix 8,* Task 14) (3) "You can make a fire. You can milk the cow. You can move the water." "At the beginning, it brings the evening to life with colours, sounds and movements." "In verse 15, I liked the pleasant sound, the beautiful drawings, and animation." (*Appendix 8,* Task 13-15) (4) "If you touch the cow, it starts to chew the cud, so the cow eats." "The picture is moving, I can see it." "The explanation of the word comes up; the cow's head is moving." "If I touch the word, the cow's mouth opens. He eats, I click on the word «chew the cud» and the cow starts chewing." (*Appendix 8,* Task 12)

Thus, at the beginning of the pilot process, based on their prior knowledge and what they learnt in the sample lesson, students were able to reflect on their own user activity and learning process in an average of 8-10% per question and to express this verbally (in writing). We should particularly emphasize the importance of verbality as well because indirect (to a limited extent diachronic) results independent of linguistic feedback show a significantly more favourable picture than the former ones.

### 2.3.2. Diachronic data

The software collected data on students' response mechanisms (the fact that attempts were made, their number and time per student and sub-task). These data show that during the pilot lesson students became more and more familiar with the digital interface adapting their response strategy to how it works, at least it is what the results improving over time suggests. In the light of diachronic figures, the process can be described as follows:
As students were not familiar with the use of BOOKR Suli software (see the opinion of the pilot teachers on this issue),[83] they made more mistakes in the first questions of the worksheets compared to the later sub-questions of the given worksheets; they tried to "find" the right answer several times. It is likely that the "interesting element" of the system's audible sound effect and visual effect that imitates the sight of a bouncing ball, which can be heard in the case of a bad

[82] The lack of response may have been due to both a lack of knowledge and a lack of time.
[83] Only 17% of respondents (teachers involved in each phase of the pilot study) and 38.5% (teachers involved throughout the pilot study) indicated that children had already got familiar with certain books of the software (not included in the pilot study in the lessons before starting the survey process) (*Appendix 3, Question 25*).

response (failed interaction), initially generated rather than reduced the number of incorrect responses. Later, however, as the experience of novelty decreased and experience extended, the number of correct answers (also for sub-tasks within the same task, where the same problem-solving strategy had to be applied) began to increase. Checking the result of the "attempt" to solve the problem and planning the next step of problem-solving (or the existence of these two moments) also suggest that students "realized" that swiping between the task pages is not a condition for completing the task, and that questions can even be omitted ("skipped"). According to the feedback given by the software, the number of students who performed the more difficult tasks decreased, but in the case of the simpler ones the number of those who performed correctly for both the first and the second attempt increased continuously. The knowledge that the software, while providing feedback to the user, also "teaches" him/her by making the correct answer available, i.e., the student can observe the effectiveness of the action performed, review, and evaluate his/her own knowledge also contributed to all of this experience. For teachers this process is indexed by figures (*Table 4*).

| **The Tale of the Green Pig** | **Task page** | **Sub-task** | **Number of those who gave a correct answer on the first try (person)** | **Number of respondents (person)** | **The rate of those who gave the correct answer on the first try** |
|---|---|---|---|---|---|
| | 1 | 1 | 31 | 67 | 46.27% |
| | 1 | 2 | 35 | 67 | 52.24% |
| | 1 | 3 | 36 | 67 | 53.73% |
| | 1 | 4 | 41 | 69 | 59.42% |
| | 1 | 5 | 54 | 69 | 78.26% |

*Table 4*
Data indicating the process of metacognitive knowledge being established

100% of students aged 6–9 answered "Yes" to the questions which directed self-reflection primarily to simple perception. ("Did you like being able to read the story on a tablet?" "Did it help you understand the story that you could read it on the tablet?") (*Appendix 6, Task 21; Appendix 7, Task 26*). A similarly good result was obtained in the case of students aged 11–12, 69.30% of whom selected the highest number of a scale of 1-5 and 17.10% selected number four (thus total 86.40% )[84] (*Appendix 8, Task 18, 20*).
Thus, overall, according to the results of the pilot survey, BOOKR Suli software can contribute to laying the foundations for metacognitive knowledge in a short time and effectively.

## 2.4. Interactive books allow for building a connection between propositional knowledge and multimedia-mediated new information

As indicated by the surveys, propositional knowledge, which is knowledge appearing in propositions, and which can be described by the formula "*S* knows that *p*."[85], (where "*S*" refers

[84] Number 3 was selected by 6.40% of subjects, number 2 by 5.00%, and number 1 by 2.10%.
[85] Margittay Tihamér: Polányi. http://www.polanyi.bme.hu/folyoirat/2004/2004-02-tudas_tudomany_es_letezes.pdf (Accessed 24.01.2024.)

to the knowing subject, and "*p*" to the proposition that is known) can be expanded better when transmission occurs multimedially than when it is transmitted through only one medium. The oscillating nature of the perceptual process can essentially "ensure" building a stronger connection between propositional knowledge and new information transmitted through multimedia: in order to be able to meet the expectations of digital reading, students must necessarily relate visual, verbal and auditory information to each other. In this way, new information coming through multiple channels can expand their knowledge. Based on the overall result, this is also indicated by responses that are otherwise incongruent to the questions asked. They suggest that, where appropriate, contrary to instructions, students decoded the text not by moving from text to image but by reversing the direction, moving from image to text, i.e. propositional knowledge manifests itself by freely exploiting opportunities offered by multimedia (see, for example, the answers to the question "List what is in the text that is not in the picture").[86]

The question asking students to identify the characters in the fairy tale intended to map the characteristics of the relationship between propositional knowledge and new information. Two of the three pre-coded answers also contained animal names not included in the text of the poem *Who Ate the Raspberries*? Students had to choose the answer that contained the correct combination of names. As they are popular characters of well-known animal tales, all subjects of the survey are supposed to have been familiar with each of the animal characters (bear, fox, rabbit, etc.). 73.30% of of the control group, which relied only on the text they read and listened to, answered the questions correctly compared to 91.70% of the students in the group using interactive books, which expanded their propositional knowledge of animal characters through various effects and interactions. (*Appendix 6*, Task 15).

The "mobilizability" of historical background knowledge was measured by the following question related to the *Family Circle* app as well: "Mark the passages of the verses by giving the number of the verses and the verse lines in them that indicate the significance of the events told by the crippled soldier." (*Appendix 8,* Task 2). The task required students not to simply mark the lines that could be assigned to the "character" of the poem, but to select them by using reflective thinking skills assuming a higher level of (interpretive) reading. 15% of the students did not answer the question, 31% were able to complete the task partially, i.e. they indicated the text passages either incompletely or with some errors, or they related the question only to the arrival of the "crippled soldier", which the animation makes stronger. 39% of students answered correctly.

## 2.5. Interactive books allow for recognising figures of speech and understanding implied meaning

In accordance with the requirements specified in the Curriculum Framework in terms of literary knowledge, students aged 11–12 should be able to recognize some of the characteristics of poetic language, such as the different ways to structure poetry, imagery, musicality, tones, different

[86] According to one respondent, "half of the forest" is missing in the first verse of the text of *Who Ate the Raspberries?* It can be assumed that the subject was influenced by the figure in the worksheet associated with the line "Beautiful is the forest everywhere".Anyway, the logic of the sentence does not correspond to the instruction actually given, but to its reverse ("List what is in the picture that is not in the text!") *(Appendix 6, Task 14).*

creative behaviours and figurative language. Another requirement is that students should be able to gain a global understanding of texts they read on the electronic interface; in addition to retrieving information from the text, they should be able to get familiar with and apply newer and newer reading comprehension strategies."[87] The task series of the impact assessment, built upon the new development results of the *Family Circle* app, focused on two figures of speech transmitted multimedially through an actor's voice as well. The aim was to measure how students understand the implied meaning of the two images. Pages 5 and 8 of the interactive book (*Figure 11, Figure 12*), where the figures of speech involved in the survey can be read differ in terms of the types of interaction.


*Figure 11*
Family Circle app, page 5, series of pictures


*Figure 12*
Family Circle app, page 8, series of pictures

The movements, sound effects, and touch modalities on page 5 are primarily for understanding the sequence of actions performed by the "young girl" and not for getting familiar with the character's personal qualities (flickering flame, throwing twigs upon the fire, smoking iron and the movement while ironing), i.e. they help students to infer the implied meaning. On page 8, however, all interactions are related to the "father", who turns his face toward the reader: the movements can be performed by his figure and on the surface formed by his figure. Swiping his arm allows him to smoke, touching the pipe can create smoke, and touching his forehead allows students to make wrinkles appear on it. The latter option, unlike the other interaction options, is also highlighted by an icon (faint, pulsing white circle). Although there was no control group participating in measuring semantic processes related to figures of speech during the pilot study, we believe that the numbers of correct answers can be considered high in absolute terms. However, it should be noted that we found a difference between the level of students' understanding figures of speech supported by interactions indirectly (page 5) and directly (page

[87] [Curriculum Framework for primary school, grades 5-8. Hungarian Language and Literature). In: Appendix 2 of Decree 51/2012. *(*XII. 21.*)* of the Ministry of Human Capacities, http://kerettanterv.ofi.hu/02_melleklet_5-8/index_alt_isk_felso.html (Accessed 24.01.2024.)

8): the figures show that in the latter case students' overall performance was better (81.60%) than in the former one (73.20%) *(Figure 13), (Figure 14).*

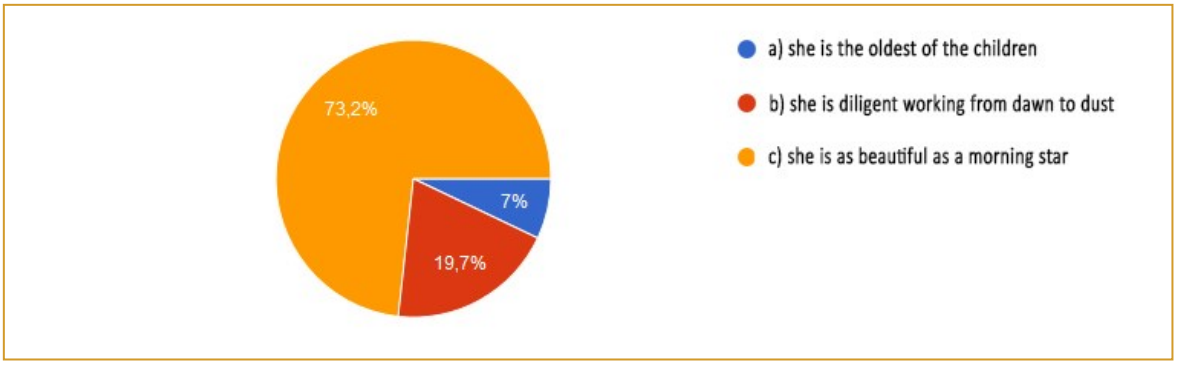


*Figure 13*
Results of decoding the figure of speech "Young girl (…) a morning star"
(number of respondents: 142 persons)

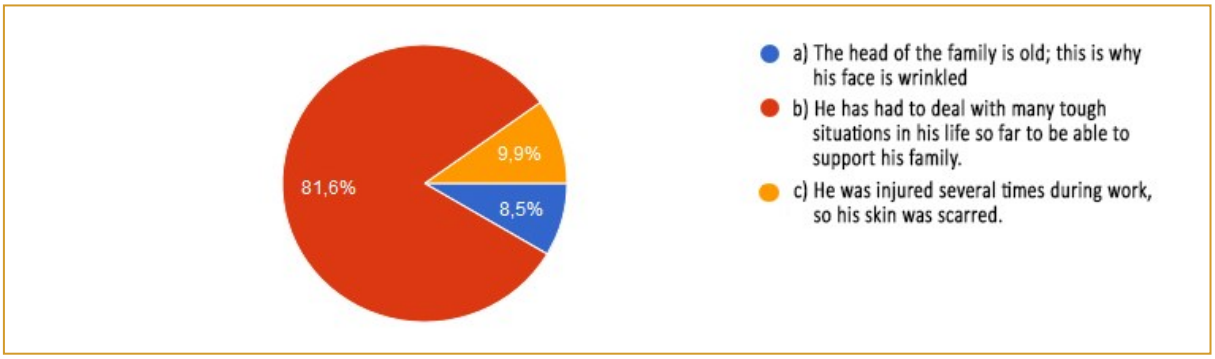


*Figure 14*
Results of decoding the figure of speech "with dusty shirt-sleeve wipes a wearied brow that has been deeply furrowed by life's cares"
(number of respondents: 142 persons)

## 2.6. Interactive books facilitate traffic between the narrative modes that make up a narrative

The orientation between the narrative modes that make up a narrative determines the effectiveness of reading because the logics, syntactic and semantic rules of the language of narration shape meaning in a text. Thus it depends on the existence of this knowledge whether students are able to recognize the form of the text: whether it is a narrative, a dialogue, a description, or perhaps some kind of reflection. In the texts processed in the pilot study, the so-called direct and indirect speech appears as a building block of narratives.

Our hypothesis in this case was based on the fact that in the use of direct speech, the recipient will encounter an already interpretive spoken form in the reader's modality. Thus it will be easier to comprehend the text in terms of reception. (During silent reading, students interpret the implied meaning of a written message without hearing prosody (rhythm, stress, and intonation of speech). In the case of indirect speech, the narrator does not directly quote someone else's words. Compared to direct speech, the narrator in this case incorporates other persons' words into his/her own speech. Consequently, we placed emphasis on measuring students' knowledge about

narrative speech because, according to our hypothesis, interactive storybooks help students to recognise the formalization of message and develop the ability to interpret it.
The measurements gave the following results:
In the case of the poem adaptation entitled *Who Ate the Raspberries*? in some of the tasks in *Appendix 6*, we measured whether students could separate speeches from each other in the narrative. The measurement results showed that students using printed books performed better: 46.7% of students answered correctly compared to 33.3% of those who used interactive books. In the case of the adaptation of *The Tale of the Green Pig*, the percentage of correct answers given to the question "Who Says That?" was almost the same for the two groups. 86.7% of students using interactive books gave the correct answer whereas in the group using printed books 86.4% of students answered correctly. In the case of the prose-like tale, the similar proportion of responses may be explained by the greater number of everyday narrative experiences due to age.

## 2.7. Interactive books facilitate identifying narrative information in the text – the key story elements "who, where, when, what and why"

Thus reading comprehension is effective if students recognize the relationships of events, happenings and actions that play a crucial role in the structure of the narrative and understand the linguistic elements that mark them. Subject pedagogy gives priority to developing skills in identifying the key elements of a narrative story (characters, setting, problem, and solution). Whether it is about partial or global text analysis, similar types of tasks appear almost constantly in lessons, and teachers can enhance students' learning experience by using cooperative learning techniques.
Task 1 in the *Who ate the raspberries?* app asks about the relationship of the locations that shape the story. There were a higher percentage of students who answered correctly in the group that used the printed text, but this result was most likely due to the inadequate motor skills required for completing the task and its novelty. In contrast, it can be observed that in the tasks where the good answer did not have to be dragged into its place, but a simpler movement had to be performed, efficiency increased. The question that asks which location appears first at the beginning of the poem written by Ágnes Nemes Nagy was answered correctly by 66.7% of students using the interactive book compared to only 46.7% of those who used the printed text. The illustration in the interactive book makes the setting of the baseline clear. When selecting the characters in the tale *I Tell you a Story about the Green Pig*, 94.8% of the students using the interactive book gave the correct answer compared to 93.2% of the students using the printed text, thus in a similar proportion. In the case of questions asking about the setting and causal relationships, the performance of the control group was similar to that of the group using the interactive book, with the latter performing a few percentage points higher than the control group.

## 2.8. Interactive books facilitate episodic memory functioning

The development of episodic memory begins in preschool with the help of various storytelling techniques. Even a child aged 4–5 can be expected to be able to identify the sequence of events in a short story. Later on, this orientation ability is one of the cornerstones of creating

experiential, lasting narrative meaning in narratives that develop and unfold metonymically and metaphorically.
Episodic memory, a fundamental component of human cognition is moved, stored and activated by tighter and looser threads of spatial, temporal, and causal relationships. However, in the digital environment, in addition to the episodic structure of verbal narratives, the phenomenon of sequential ordering in the visuality of the application must also be taken into account.
To test our hypothesis, we created "sequencing" tasks during the pilot period. In the case of *The Tale of the Green Pig*, the measurement results show that the group using interactive books demonstrated a deeper level of processing and retention of words in the episodic memory than the control group. In the sub-tasks of the first task of the application, the performance of students using interactive books gradually improved: they worked with an efficiency of 78.26%. With regards to classroom implementation it is very important that as the measurement results showed, students did not give up completing the task, they persisted until they succeeded.

## 3.1. Sample lesson plans provide support

Taking into account the goals and tasks specified in the National Core Curriculum and the Curriculum Framework for the subject Hungarian language and literature, as indicated above, we created sample lesson plans for the implementation of all three interactive books used during the pilot study, (*Figure 15*). The sample lesson plan created for the poem *Who Ate the Raspberries*? provided tasks for both the group using the interactive group and the one using the printed book and helped teachers to conduct a content analysis on the text of the poem in the lesson (*Appendix 19*). As the tale *The Tale of the Green Pig* was presented due to its length in two lessons, we created a preparatory lesson plan (*Appendix 20*) and a lesson plan that allowed the synchronous discussion of the printed and multimedia text (*Appendix 21*). Regarding the type of lesson presenting the poem *Family Circle*, it was a kind of revision lesson (as mentioned above, the 11–12 year-old students of the schools participating in the pilot study had previously learned the poem by János Arany before the pilot started) and we structured the associated sample lesson plan in terms of content and methodology accordingly (*Appendix 22*).

In the introduction to the sample lesson plans, we gave a detailed description of the development focus; we incorporated introductory tasks developing language awareness in the classroom; in the tuning-in and meaning-making stage of the lesson and the reflection stage of the lesson, in addition to the recommendations (steps) for the content structure of the lesson, we indicated the practical tasks related to the use of tools in colour. Regarding the sample lesson plans as aids, the feedback from teachers involved in the impact assessment surveys indicated that they had a positive attitude to them. As they stated, the sample lesson plans helped them to organize the teaching and learning process and the lesson. 93.80% of the teachers using the sample lesson plans did not have any difficulty in using interactive books in the classroom. Of the pre-coded response options for the question, "What can best facilitate the professional integration of interactive books into the classroom?"[88], 68.80% of the subjects answered that it was the sample lesson plans (*Figure 16*) (*Appendix 9*, *Question 10*).

[88] It is a question that allows multiple answers.

It can be stated that during the pilot study, the 16 teachers involved in the preparation of the impact assessment integrated interactive books seamlessly into teaching literature in the classroom.

| **I. The introduction stage of the lesson** | **Method used** | **Tool** | **Form of work and teacher's role** | **Development focus** |
|---|---|---|---|---|
| **I.1. Classroom Desk Arrangement**<br>Arrange the tables in the room so that 4 children can sit at it at the same time. Ensure that students can move around.<br>Required equipment:<br>▪ For those using the printed book: textbook, exercise-book, pen holder<br>▪ For those using the interactive book: tablet | coordination | classroom equipment:<br>▪ course book<br>▪ exercise book<br>▪ tablet<br><br>(It is advisable to place the worksheets on students' desk at the beginning of the lesson upside down.) | coordinator | |
| **I.2. Group formation** | | | | |
| **"Find its match."**<br>We cut a picture into 2-4 parts (according to the size of the group). We cut as many pictures as many groups we want to have. The parts of the pictures having been handed out, everyone tries to find parts of the same shape. Thus, the students who have the parts of a raspberry of the same shape will form a group.<br>The topic of the pictures refers to the text to be analysed.<br>Question: While you are trying to find your groupmates, observe the parts carefully and guess what picture represents. | | A large picture (several copies) of a raspberry. | coordinator | ▪ developing visual attention<br>▪ developing visual logic and content logic skills<br>▪ recognising formal qualities, developing abstraction skills |

*Figure 15*
Extract from the sample lesson plan for Who Ate the Raspberries?

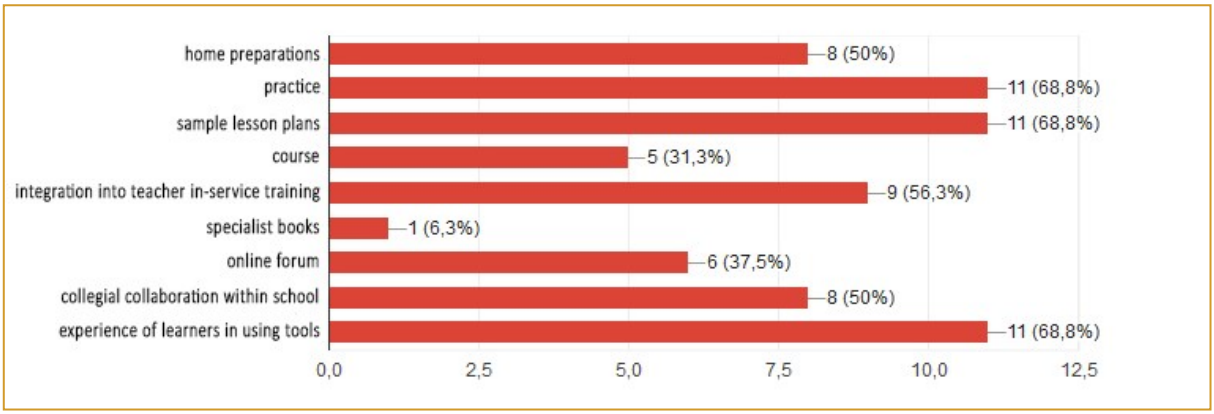


*Figure 16*
Teachers' views on what can best facilitate the professional integrationof interactive books into the classroom
(Number of respondents: 16 persons)

## 3.2. Current professional and methodological knowledge is to be expanded

The teachers involved in some of the sub-tasks of the pilot study as well as in the impact assessment had positive attitudes towards the use of interactive books. As they noted themselves, they looked forward to the educational tasks related to the implementation of interactive books in the classroom, felt happy, motivated and were curious about it (see *Table 3*) and did not have any difficulties in using them in the classroom (*Appendix 9, Question 6*). Our subjects had similar views on creating lesson plans: 75% of the teachers involved in the impact assessment and 53.30% of the participants in the pilot study stated that they would not have any difficulties in preparing lesson plans built upon the use of interactive books. The exact data are shown in *Figures 17, 18, 19* and *20* (*Appendix 9, Question 8*).

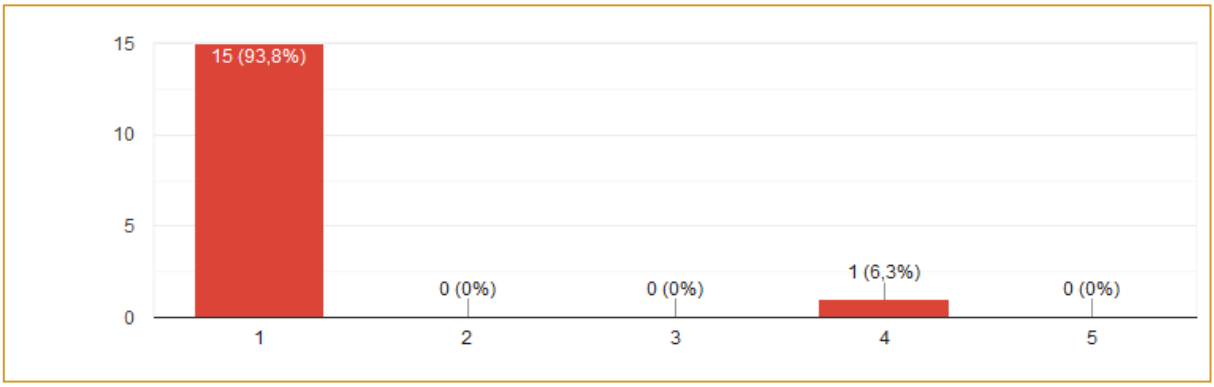


*Figure 17*
To what extent did teachers involved in the impact assessment have difficulties in implementing interactive books in the classroom? (1=no, 5=great)
(Number of respondents: 16 persons)

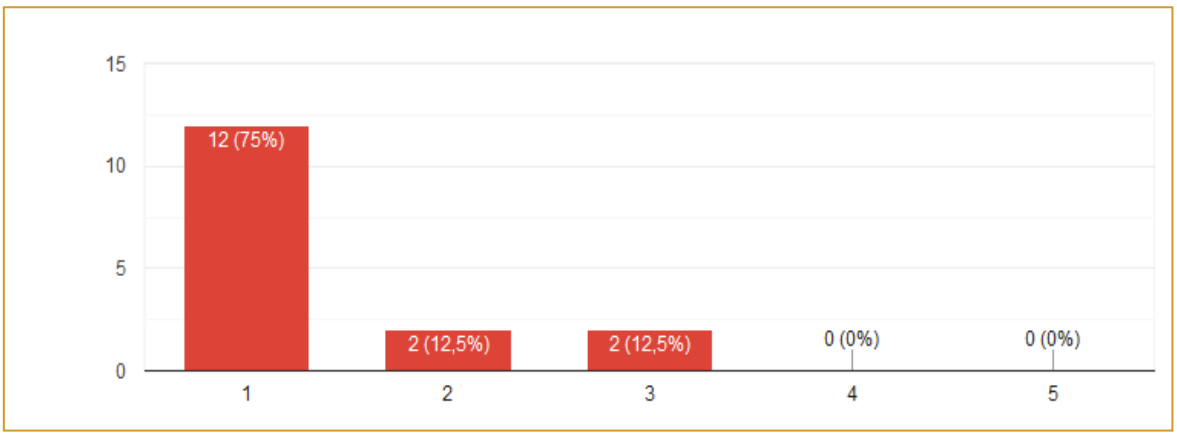


*Figure 18*
To what extent would teachers involved in the impact assessment have difficulties in creating lesson plans based on the use of interactive books? (1=no, 5=great)
(Number of respondents: 16 persons)

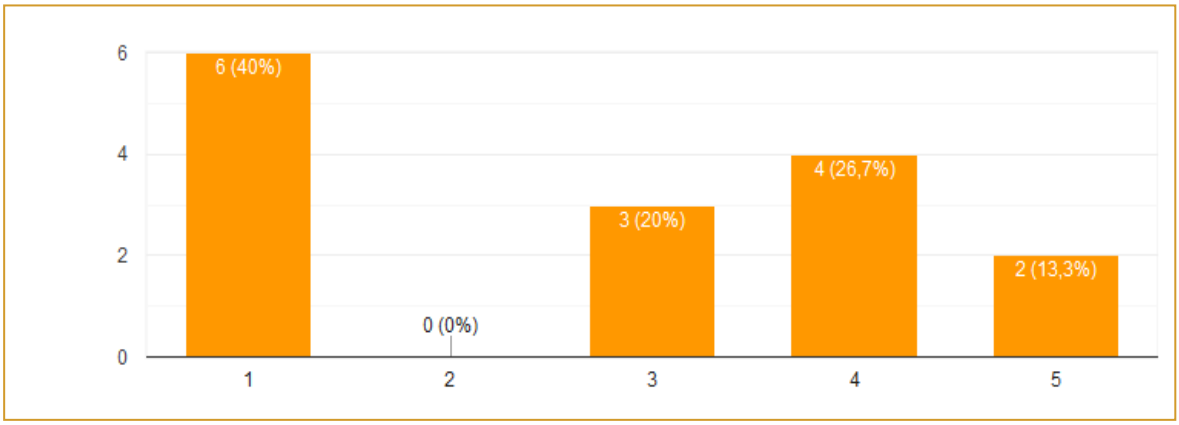


*Figure 19*
To what extent did teachers (not involved in the impact assessment) have difficulties in implementing interactive books in the classroom? (1=no, 5=great)
(Number of respondents: 15 persons)

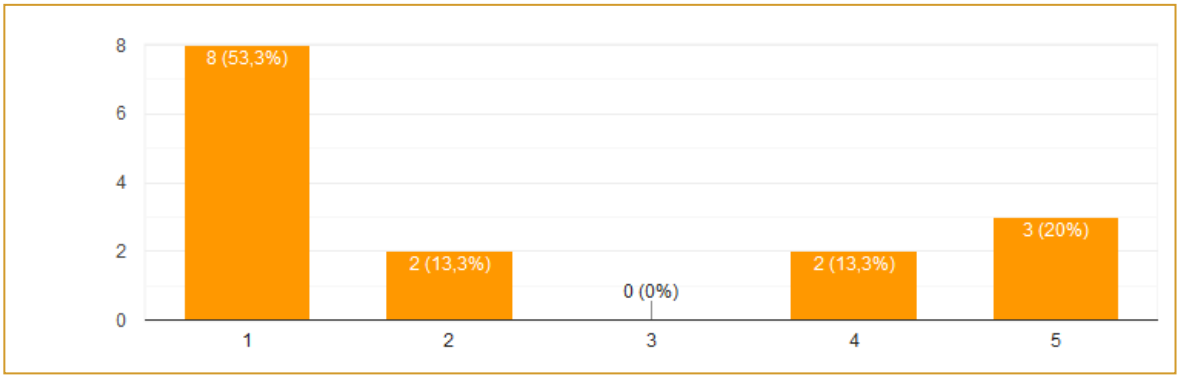


*Figure 20*
To what extent would teachers (not involved in the impact assessment) have difficulties in creating lesson plans based on the use of interactive books? (1=no, 5=great)
(Number of respondents: 15 persons)

The responses to the question "What can best facilitate the professional integration of interactive books into the classroom?" were heterogeneous in both groups, and, in relation to the two groups, they also differed in terms of content (*Figure 21, Figure 22*). It can be observed that teachers participating in the impact assessment who implemented the BOOKR Suli software for a longer period of time, continuously and following the recommendations of the pilot's professional leaders (see participation in webinars, professional briefings and trainings, methodological letters, the use of sample lesson plans and specialist books), responded with increased professionalism and demonstrated greater responsibility and higher levels of commitment than those who were involved in the survey process only on one occasion. In fact, the former group would place more emphasis on teacher training and in-service training within the institutional framework in the future, and also considers the role of sample lesson plans in the implementation of interactive books to be more important than the latter group.

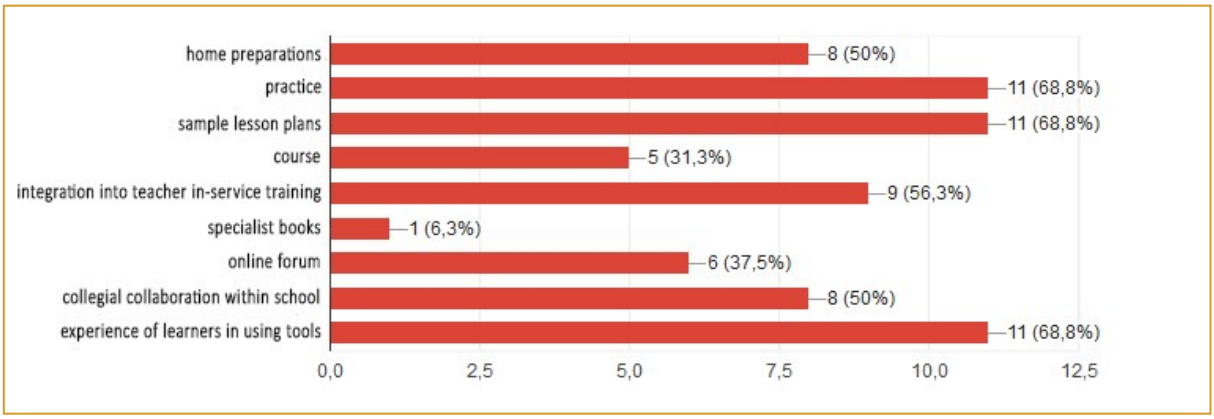


*Figure 21*
Views of teachers involved in the impact assessment on the professional ways to integrate interactive books into the classroom
(Number of respondents: 16 persons)

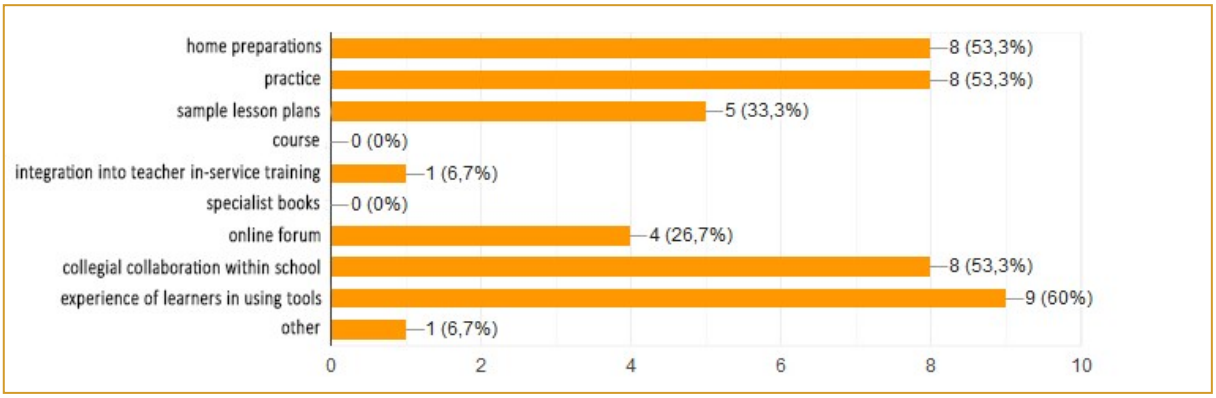


*Figure 22*
Views of teachers (not involved in the impact assessment) on the professional ways to integrate interactive books into the classroom
(Number of respondents: 15 persons)

We believe that developing reading and reading comprehension skills through the use of interactive books requires expanding teachers' current professional and methodological knowledge related to teaching digital literature. At present, lower grade teachers and teachers of

the primary school are not adequately prepared to design lessons with interactive books in a similar quality as with printed books. In an interactive classroom students have to become users from readers, their changing status and function requires acquiring a new kind of communication competence and teachers are expected to enable them to acquire it. During the pilot study, teachers experienced and became aware of the fact that students using interactive books acquire knowledge differently from text analysis through printed books. Thus, in accordance with the new knowledge structures, teachers also need to learn new techniques and create new routines.

## 4.1. Teachers are expected to be convinced of the advantages and benefits of interactive books

Getting familiar with the software and using it in their lesson during the pilot convinced teachers of the effectiveness of interactive books in the classroom. The subjects of the survey acknowledged that based on their present experience, they would incorporate interactive books into their lessons besides using printed books in the future. Based on the responses of teachers participating in the impact assessment, expressed as a percentage, the latter statement meant the following: 18.80% of teachers stated that it would be advisable to present the curriculum through interactive books in 20% of lessons, 25% would stated the same in 30% of lessons, 25% would implement them in 40% of lessons and 18.80% of teachers would use them in 50% of their lessons. 6.30% of the subjects would use the applications in 60% or even 70% of their lessons *(Appendix 9, Question 33) (Figure 23).*

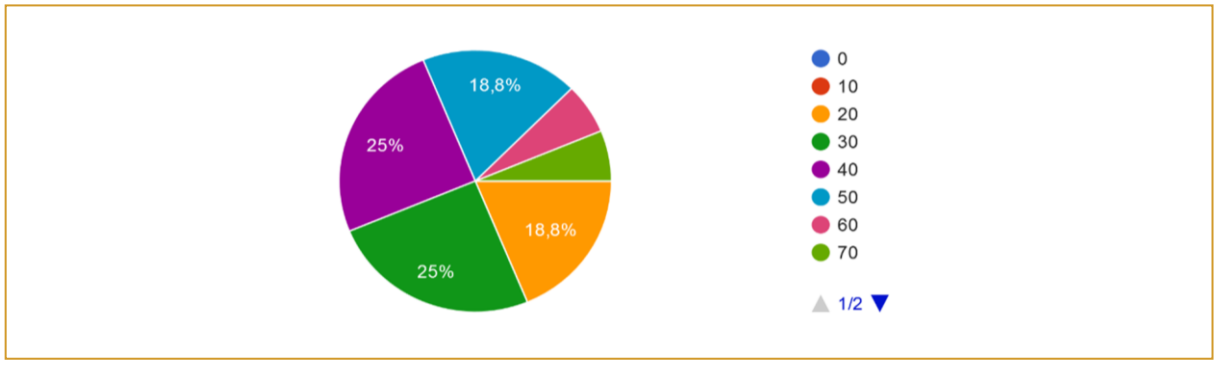


*Figure 23*
Views of teachers participating in the impact assessment on in what percentages of Hungarian language and literature lessons it would be useful to present the curriculum through interactive books
(Number of respondents: 16 persons)

Of the questions to assess the experience behind the high numerical values, the most important were: "What types of text do you think interactive books would be suitable for analysing?" "In your experience, in which type of lesson can interactive books be best used? In your opinion, which stages of the lesson can the BOOKR Suli app used in? In our subjects' views, the BOOKR Suli applications provide a good basis for lessons presenting new content and revision lessons (the percentage of relevant answers: 100%), and they have clear benefits (according to 93% of respondents) especially in the meaning-making stage of lessons, (however, according to 56.30% of respondents, they are also a benefitial tool in the tuning-in stage and the reflection stage of lessons). Furthermore, they facilitate teaching the types of text that provide opportunities for experiencial learning (according to 100% of respondents). According to 81.30% of the subjects,

they are also effective in lessons that provide opportunities for students to develp skills and knowledge, 87.50% of respondents emphasized their importance in lessons teaching a historical topic, and 81.30% thought that they are suitable for teaching informational texts in the classroom. *(Appendix 9, Question 15).*

Teachers have found that BOOKR Suli is a powerful motivating force in the classroom regardless of students' gender, academic success, previous performance in reading, and their parents' level of education and literacy skills and social environment. All this may also have contributed to the fact that teachers recognised the benefits of implementing interactive books in the classroom. In our subjects' views, (12.50% and 18.50% and 18.50%), it is true that children with poor academic achievement, poor reading skills and brought up by parents with lower literacy levels are far more engaged and motivated by the multimedia mode of knowledge transmission than their peers with good academic achievement, good reading skills and growing up in a literary-rich environment. *(Appendix 9, Questions 44-47).*

It should be noted that the teachers involved in the preparation of the impact assessment during the pilot study indicated not only in their responses to the questionnaires, but also in their subjective reports and letters to the developers that the experience they gained over the four months (September-December 2019) convinced them of the benefits of the tool. *(Appendix 11)*

## 4.2. Teachers consider interactive books as digitally transmitted literature rather than gamification

In addition to interactions that are essential for playing the story, the majority of applications available on the interactive book market also include games for children to learn new skills and have fun at home. And while the latter, at least quality applications, promote children's development in many ways, they are not explicitly designed for educational purposes. Developed for institutional use, the BOOKR Suli applications are task-centred in terms of their interactions intended to unfold and understand the story (see word explanations, sound effects that reinforce the meaning of text and images) and the "appendices" at the end of the applications, which are structurally highlighted and separated. This means that the BOOKR Suli's interactive books contain "tasks to be completed," "responsibility for completing the assigned tasks," that require students' attention and knowledge to complete the assigned tasks. The software thus provides alternative media for workbooks and worksheets.

"Gamification" reminiscent of different types of digital games, including interactive books with "fun" modalities (e.g: blowing, shaking, lifting overhead) is limited to just some elements of effective and visual feedback of the BOOKR Suli app, only to the details whose primary purpose is to keep students motivated and maintain their attention. For example, in the event of a task failure, students can hear a characteristic feedback or the blank bounces the incorrectly matched pair in an exciting way in terms of visuality.

Teachers' views on gamification are presented in detail in *Table 2* (see point 8) averaging the numerical data. It can be stated that teachers involved in the pilot study considered the "appendices" to be less playful than the interactions embedded in the story, and teachers who participated in the impact assessment and thus prepared their lessons using interactive books in accordance with the expectations of the pilot study generally considered the BOOKR Suli

software to be an application designed for educational purposes rather than a gamification application.

## 4.3. Interactive books motivate students to read

The fact that the younger generation has an affinity for the technomedial mode of transmission was clearly demonstrated during the pilot study. Students' responses confirm that they have an emotional attachment to multimedia devices.
When measuring the use of all three interactive books, we recorded data for some characteristics of students' home learning environment in both groups (A, B): Do students own a smartphone or tablet?; Are there any technological devices in the family?; How often do they use the devices? (See *Appendix 10, Questions 4-6*). Data aggregates show that as age increases, both student ownership of mobile devices and the frequency of their daily use of mobile devices increase. However, fewer students use the type of smart devices most suitable for transmitting interactive books, i.e. tablets, and as age increases, frequency of use decreases slightly (by their own admission, 33.30% of students aged 8 compared to 22% of students aged 11–12 use a tablet). (*Table 5*) By their own admission, students aged 8–10 use their smartphones more frequently (44.30%) for listening to and watching tales than those aged 11–12 (21.70%). However, in terms of game use, there is hardly any difference between students aged 9–10 and those aged 11–12 (students aged 9–10: 79.30%, students aged 11–12: 80.40%) *(Appendix 10, Questions 7-9).*

Thus, our pilot study survey shows that smart device use was generally not new to students whereas tablet use was new to 33.30–54.30% of students. 61.50% of the student survey participants had no previous experience with the type of software, BOOKR Suli as a collection of interactive books, such as books including tasks to be completed in a digital learning environment. As stated by 61.50% of teachers, the software had not been tried out prior to starting the sample classes. However, 38.50% of teachers had already laid the foundations for software operation knowledge (within this, 40-40% of students aged 12–12 and 20% students aged 9 were already familiar with using it. Teachers teaching students aged 8–10 had not used the software in the classroom before the pilot study started *(Appendix 3, Question 25, Appendix 9, Question 12).*

Overall, therefore, the clearly high enjoyment index, by itself, cannot be justified by either technological or genre novelty, students' positive responses are primarily related to the particular experience with using the BOOKR Suli software. This statement is also supported by the following data: Students aged 8–10 were expected to respond 'yes' or 'no' to questions about whether they liked to use interactive books, students aged 11–12 could rate their level of preference on a five-point scale. 100% of students aged 8, 98.30% of students aged 9, 64.30% and 26.40% of students aged 11–12 liked the tablet-based transmission of the story and the interactive book version of the poem *(Appendix 10, Questions 1a, 1b) (Table 6, Table 7).*

| Question | The response rate of the group of respondents aged 8 using the printed text (15 persons) | The response rate of the group of respondents aged 8 using the interactive book (12 persons) | The response rate of the group of respondents aged 9–10 using the printed book (62 persons) | The response rate of the group of respondents aged 9–10 using the interactive book (59 persons) | The response rate of the group of respondents aged 11–12 using the interactive book (143 persons) |
|---|---|---|---|---|---|
| **1. Do you own a smartphone?** | | | | | |
| a) yes | 26,7 | 16,7 | 37,1 | 62,7 | 81,0 |
| b) no | 73,3 | 83,3 | 62,9 | 37,3 | 19,0 |
| **2. Does anyone in your family have a tablet?** | | | | | |
| a) yes | 64,3 | 58,3 | 61,3 | 55,9 | 57,0 |
| b) no | 35,7 | 47,1 | 38,7 | 44,1 | 43,0 |
| **3. How often do you use your phone?** | | | | | |
| every day | 20,0 | 41,7 | 51,6 | 57,6 | 68,3 |
| once or twice a week | 20,7 | 25,0 | 24,2 | 18,6 | 16,2 |
| I don't use it | 53,3 | 33,3 | 24,2 | 23,7 | 15,5 |
| **5. If you have a tablet, how often do you use it?** | | | | | |
| a) every day | 33,3 | 25,0 | 23,7 | 23,7 | 22,5 |
| b) once or twice a week | 20,0 | 41,7 | 28,8 | 23,7 | 23,2 |
| c) I don't use it. | 46,7 | 33,3 | 47,5 | 52,5 | 54,3 |

*Table 5*
Student' knowledge and use of smart devices

| **Circle the number that best expresses how much you liked the interactive book version of the poem. 1 means you didn't like it, 5 means you liked it very much.** | **The response rate of the group of respondents aged 11–12 using the interactive book (143 persons)** |
|---|---|
| 1 | 1,4 |
| 2 | 1,4 |
| 3 | 6,4 |
| 4 | **26,4** |
| 5 | **64,3** |

*Table 6*
The enjoyment index of students using the Family Circle app

| **Did you like being able to read the tale on a tablet?** | **Response rate of the users of the *Who Ate the Raspberries?* app (27 persons)** | **Response rate of the users of the *The Tale of the Green Pig* app (121 persons)** |
|---|---|---|
| yes | **100** | **98,3** |
| no | 0,0 | 1,7 |

*Table 7*
The enjoyment index of students using Who Ate the Raspberries? app and The Tale of the Green Pig app

## 4.4. Interactive books result in a deeper immersion than printed books

The above hypothesis about the relationship of the two media (printed text and multimedia text) was confirmed by the responses of teachers involved in the preparation of the impact study. The results about the use of interactive books in the classroom showed that interactive books are devices capable of triggering a high degree of immersion, and thus, the correctness of our hypothesis about implementation.
87.50% of teachers responded "yes, beneficially" to the question "Did interactive books have an impact on the classroom atmosphere?" 6.30% responded "no" and the same number of teachers responded "yes, but unfavorably". They justified their positive response by the following. "The kids enjoyed it immensely." "They liked the new method." "Students were more motivated by the use of the app." "They see it, they hear it and they find it interesting." "It was exciting and inspiring to explore the story page by page." *(Appendix 9, Questions 38, 39).* According to the majority of teachers (81.30%), the use of interactive books had a positive impact on students' classroom behaviour. The figure below shows the rate of change in certain areas. The rates of data related to students' engagement, motivation and discipline tend to be remarkably high *(Figure 24).*

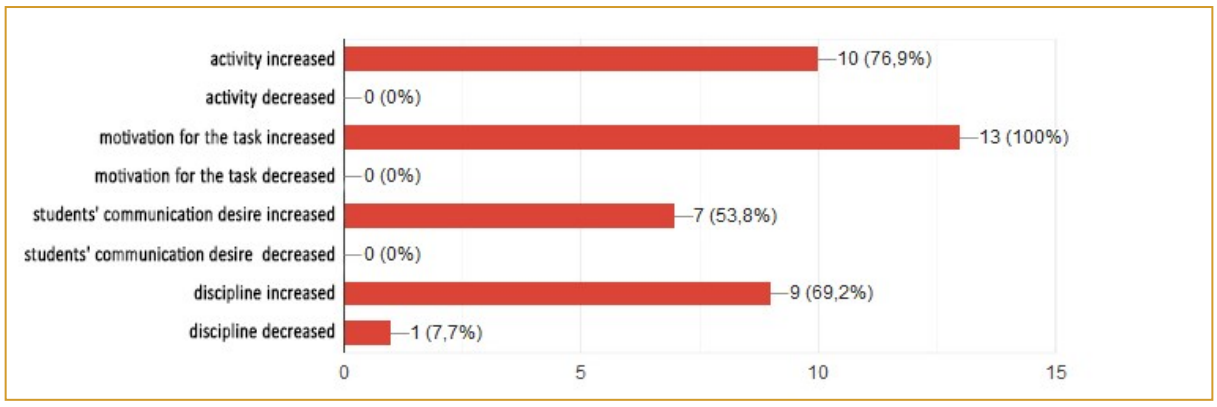


Figure 24
*Manifestation of immersion: Changes in students' classroom behaviour*
*(Number of respondents: 13 persons)*

After the pilot lesson, the students in the pilot classes always asked teachers to allow them to use the BOOKR Suli app in class in the future as well." Thus, in terms of the enjoyment index it was a 100% result.
100% of teachers who were involved in the preparation of the impact assessment and those who had previously tried out the software, and those who were only partially involved in the pilot

study responded "yes" marking the highest point on a five point-scale to the question "Do you think students were happy about the presentation of the learning material through a digital medium?". *(Appendix 9, Question 48)*

According to teachers, all the students (100%) who were in the "tablet group" during the data collection were happy to be given a digital task to complete while students who were in a "paper-based group" responded negatively, see data in *Figure 25 (Appendix 9, Question 49)*

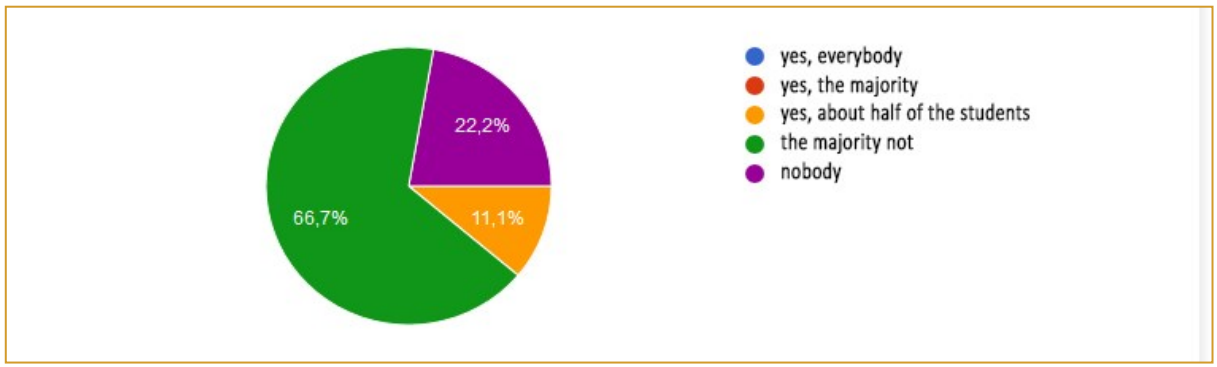


*Figure 25*
Teachers' views on whether students in the control group were happy to get familiar with the tale "in a paper-based form"
(Number of respondents: 9 persons)

Some of the teachers' comments are as follows: "Half of the students in the class read the text on paper, the other half read it digitally and all of them wanted to use the digital learning tool. Finally, we were able to make students understand why there was a need to divide them up into groups." "The kids were happy and engaged in their work; the others would have liked to use the tablets as well. They didn't disturb each other. Everyone was paying attention to their tasks."

# SUMMARY OF THE RESULTS OF THE DEVELOPMENT

This chapter summarises the main research findings of the study. The table below (*Table 8*) shows the criteria for (left column) and results of (right columns: yes/partially/no options) measuring language awareness and digital reading performance of students using interactive book vs. printed texts. In the column headings, the main hypotheses of the research (questions of implementation of interactive books in Hungarian language and literature lessons) are marked with green colour, and their sub-questions are numbered. The summary was, on the one, based on the data already presented in the previous chapters, collected through online questionnaires and the teacher admin interface, namely: 2219 students downloaded a total of 4303 books, the number of aggregated data was 172 614 data sets. On the other hand, we took into account the quantitative factors mapped for the number of students per grade and the number of teachers per institution, related to certain survey areas (See the tables in the chapter on presenting the results of the development).

| **HYPOTHESIS (in relation to students)**<br>**BOOKR Suli apps enhance development in various areas and are more effective than printed texts** | **yes** | **partly** | **no** |
|---|---|---|---|
| (1) 1<br>word-level knowledge | + | | |
| (1) 2<br>syllable-based reading | | + | |
| (1) 3<br>meaning identification | + | | |
| (1) 4<br>understanding time-space relationship | + | | |
| (2) 1<br>recognising the relationships between the various types of media | + | | |
| (2) 2<br>formulating the central idea of the text | + | | |
| (2) 3<br>laying the foundations for metacognitive knowledge | + | | |
| (2) 4<br>building a connection between propositional knowledge and new information | + | | |
| (2) 5<br>understanding implied meaning | + | | |
| (2) 6<br>understanding narratives modes | | + | |
| (2) 7<br>identifying the key topic elements: who, where, when, what, why | + | | |
| (2) 8<br>episodic memory | + | | |

| | | | |
|---|---|---|---|
| **HYPOTHESIS (in relation to teachers)**<br>**BOOKR Suli apps can be implemented in pilot lessons** | | | |
| (3) 1<br>sample lesson plans offer support to teachers | + | | |
| (3) 2<br>teachers' current professional and methodological knowledge is to be expanded | | + | |
| (4) 1<br>teachers will be convinced of the effectiveness of interactive books | + | | |
| (4) 2<br>teachers consider them as digital literature rather than gamification | | + | |
| **HYPOTHESIS (in relation to students)**<br>**BOOKR Suli apps can be implemented in pilot lessons** | | | |
| (4) 3<br>interactive books motivate students to read | + | | |
| (4) 4<br>they result in a deeper immersion than printed books | + | | |

*Table 8*
Summary of the findings of the pilot study

The aggregate values show that, in terms of the criteria we hypothesized, the implementation of interactive books in the classroom is more effective and useful than that of printed texts. The numerical values related to students' reading comprehension results and students' and teachers' reflections are higher for 14 of the 28 criteria and in the case of 4 criteria they are higher with regards to the reception/reading and implementation of interactive books compared to printed texts. In terms of students' user/reader performance and teachers' teaching methods and experiences in the classroom, all this can be summarized like this.

Our research has shown that digital learning tools can be successfully incorporated into the development process of reading comprehension skills in the classroom. This statement is based on our experience that when using an interactive storybook, teachers do not have to "disassemble" the subject pedagogical environment of lessons for developing reading comprehension skills based on print reading. In other words, cooperative learning methods[89], can be applied and the forms of work in the classroom are selected in a similar way as in lessons in which a printed text is used.
In both cases, when developing reading comprehension skills, the goal is to enable students to construct their own personal knowledge. In the pilot lessons, teachers had to create the optimal conditions for the students of both groups to achieve this goal during the frontal class work with a control group involved. The need to ensure an optimal learning environment was primarily justified by the age characteristics of children participating in the pilot process. It is well known that as Piaget's theory of cognitive development suggests, children' activity, their active

[89] Nagy Emese, K.: Több mint csoportmunka – Munka heterogén tanulói csoportban. [More than Group Work – Working in a Heterogeneous Group of Students]. – Bp.: Nemzedékek Tudása Tankönyv Kiadó, 2012.

participation in activities is the driving force behind the interest and openness of children aged 7–11.[90] In the sample lesson plans we developed to provide support to teachers, we made recommendations for how to activate students. In the tuning-in stage of the lesson that lays the foundations for reading motivation, we have formulated recommendations in order to facilitate that reading comprehension occurs at a more elementary, more sensory level of reception.

With a control group involved, and different ways of reading and text interpretation used – search reading, selective reading – i.e. in terms of *the effectiveness of reading strategies*, there was a measurable difference in the performance of groups of students using interactive books and printed texts – in favour of the former. Following the grades of *the hierarchical model of reading comprehension*, in 10 of the 12 criteria that measured the effectiveness of reading comprehension strategies, the numerical value was higher among students using interactive books. At the level of *literal reading*, word-level language proficiency as well as meaning identification showed higher values. At the level of *interpretive reading,* their performance was better in understanding time-space relationship, recognising the relationships between the various types of media, formulating the central idea of the text, laying the foundations for metacognitive knowledge, identifying key topic elements, episodic memory, and building a connection between propositional knowledge and new information. And at the level of *critical and creative reading* understanding implied meaning produced better results.

As regards to teachers, it is important to note that the study implicitly assumed that lower grade teachers and teachers of the primary school involved in the pilot process have a positive attitude towards the use of interactive books. Our previous research showed that if teachers are not provided with goal-oriented information, training programs and good practices, they have an aversion to the use of multimedia tools in the classroom, such as interactive books. In contrast, a supportive relationship is established (can be established) if teachers have the opportunity to learn how to use the tools, to get familiar with user goals and other previous pedagogical-methodological results. In the training that formed the basis of the pilot process, a "breakthrough" took place: teachers' reflections revealed that they accepted the innovation, they agreed with the idea that the concept of a text should be understood differently in an innovative educational environment; that the complex sign system of the medium requires the same processing flexibility from teachers as from students; and that despite the configurational relationship system, while exploring multimedia contexts, children "reading" the tablet find the same narrative content as those who read the printed text. Thus the content requirements of the documents, i.e. the Curriculum Framework determining the educational process, the developmental tasks formulated in them can be fulfilled and the learning goals can be achieved.

In the process of learning and applying different reading strategies, the activity of "good readers" can be indicated by a numerical value. According to the relevant literature, their most important feature is that they create mental images during reading. One of the cornerstones of proficient-level writing and reading skills that lay the foundations for reading is the existence of an internal representation of a given sign. Its creation is based on the centuries-old tradition of education, illustration that uses hearing and touch: in addition to semantic sources, teachers have also been using information from perceptions for centuries. At the same time, while the emergence of the

[90] Piaget, Jean: Szimbólumképzés a gyermekkorban. [The Formation of the Symbol in the Child]. – Bp.: Kairosz Könyvkiadó KFT., 1999.

new hybrid medium has led to marked changes in children's culture and has already forced an adaptive definition of this content that can be described in the child-device relationship in scientific thinking, most teachers still have aversion to the synergistic space provided by the digital device as, in their view, it poses threat to the creation of mental images. [91] Resolving this contradiction is one of the future tasks of teacher education.

However, the results of the pilot survey related to teachers – in terms of the adaptive response of education to changing cultural processes – were encouraging. The teachers participating in the pilot study became aware that interactive books allow students to gain a deeper understanding of the text through immersion in the reading process compared to printed texts. It also became clear for them that compared to the printed text the new medium positively impacts students' reading motivation and ultimately their reading comprehension. On the whole, in the integration of interactive books into the classroom it was the conditions which are considered to be the cornerstones of students' becoming good readers that were complied with the most.

[91] Lehmann Miklós: A reprezentációk realitása. [The Reality of Representations]. – In.: Filozófia – művelődés – történet. [Philosophy – Culture – History]. / ed. / Donáth Péter – Farkas Mária. – Bp: Trezor, 2004. p. 17–32. http://old.tok.elte.hu/tarstud/filmuvtort_2004/repreal.pdf (Accessed 24.01.2024.)

# SUMMARY

The publication presents the results of an empirical study carried out in 2019-2020 within the framework of an agreement between the Klebelsberg Centre of the Ministry of Human Capacities and Móra-BOOKR Kids Kft, with the participation of a large number of students and teachers. It proves with data that the use of interactive books in the classroom facilitates students' interpretation of literary texts: different configurations of the hybrid media environment contribute to students' gaining a deep understanding of literary texts.

This statement has already been hypothesized by international reviews in the last few years as was referred to in the introduction to the publication, and moreover, it has even been verified, in part or in whole, by taking into account various cultural-social-communication contexts. At the same time, they emphasized that the interactive book as a new and innovative medium for the transmission of children's literary works and its role in recipient-user processes can be judged by researchers only by providing partial results in lack of a historical perspective today. Therefore, in addition to the theoretical study of interactive books, there is a need for further empirical research on user processes, namely, by taking into account immanent features of the medium such as the question of type or aesthetic-technological quality.

Consequently, we have developed the criteria of the present publication and the survey instruments of associated research, on the one hand, in accordance with the existing trends of international reviews, and on the other hand, by focusing on the white spots of this research. By the latter statement we mean primarily the volume and geographical characteristics of surveys: in Hungary no research has been done on the institutional implementation of interactive books so far, and the present project can be considered to be not only the first but also a large scale project in terms of the number of subjects involved in the surveys and the territorial coverage of institutions.

We hope that our findings make a valuable contribution to the topic as our research has focused on issues of a certain hitherto little-studied type of interactive books and the implementation of this type. They belong to the types of "discrete" digital books that have so far been little investigated in international studies in terms of the applications, the low number and variety of interactions involved in the study, and their role in shaping the story, and they are story-and task-oriented rather than game-oriented.

This publication is associated with a four-month project carried out through the collaboration of teachers, students and researchers and supported by the ministry. Thus we sought to explore the results and developments presented in the context of their "historical background", by taking in account the steps of a multi-stakeholder communication and work process. In our view, this methodological complexity may also be a novelty, especially in terms of presenting feedbacks that had an impact on application development, (see modifying the interaction types of implemented interactive books; developing the teachers' admin interface, etc.) As regards to students, developers became aware of the fact that changing one input factor (printed text vs. tablet) caused a positive change in several factors in the output (text comprehension skills). As far as teachers are concerned, their intention to change attitudes as well as their adaptability to technological change provided convincing evidence about it. From an educational

methodological point of view, the professional training of teachers was also an important part of the project, which, on the hand, meant maintaining a training program (in-service training in the form of webinars), and on the one hand, developing teaching aids: making sample lesson plans available.

Finally, we consider it important to mention that our publication sought to analyse students' reading comprehension strategies with a more hierarchical system of criteria compared to previous research. Thus, it also examines sub-skills such as understanding relationships; recognising relationships between the various media; building a connection between propositional knowledge and new information; laying the foundations for metacognitive knowledge. From a methodological point of view, further research can also be facilitated by the full text and image materials of the survey instruments included in it.

We acknowledge the limitations of our study. First, although the survey area designated by the Klebelsberg Centre covered the whole country, the institutions surveyed were mainly micro-regional schools, and the number of classes of teachers undertaking to adapt the entire pilot process was unbalanced as well. Thus, generalizing the results besides our measurement sample can obviously pose risks. At the same time, we hope that our publication will provide aspects that can be used well for other later research, whether for pedagogical-educational or technological purposes, and will provide appropriate points of reference in certain sub-questions.

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## Videos

| | |
|---|---|
| | Sample book, presentation<br>https://www.youtube.com/watch?v=xhPppHZl77g&feature=youtu.be |
| | Who Ate the Raspberries? presentation<br>https://www.youtube.com/watch?v=kUvukNV5sR0&feature=youtu.be |
| | The Tale of the Green Pig, presentation<br>https://www.youtube.com/watch?v=OjnDZUceJww&feature=youtu.be |

| | |
|---|---|
|  | Family Circle, presentation<br>https://www.youtube.com/watch?v=TD5hp_m16Yo&feature=youtu.be |
|  | Video summary about the BOOKR Suli-webinar<br>https://www.youtube.com/watch?v=sqrsyVa2SSw&feature=youtu.be&fbclid=IwAR1NTXRR4rK59H-w_-oM21ekq-TOddeihqXyrN-0VKLhhqftsHPwMM4H_So |
|  | Video summary about the BOOKR Suli-training<br>https://youtube.com/watch?v=U1UofTeMK78&feature=share |
|  | User's guide of BOOKR Suli<br>https://www.youtube.com/watch?v=LcoczrD3vI4&feature=youtu.be&fbclid=IwAR1RqpBtkbkGNHZJ4d3SG7BALQ3pARA90s8rcwAGmJL0qNK5h_b97WReye4 |
|  | Presenting the BOOKR Suli administrative interface<br>https://www.youtube.com/watch?v=3k1B53HCv1k&feature=youtu.be&fbclid=IwAR2MdbeCc3sBpMK8SJ0MKqqtB96hn3Ih9SRW0PMSMcd0CrN_LHPh47cdneQ |

# APPENDICES

## Tables

*Appendix 1*

Geographical location of the public educational institutions involved in the pilot study and the impact assessment with indicating the school districts

*Appendix 2*

List of schools participating in the impact assessment and class data

| Grade | Printed book | Interactive book | Headcount | The name of the town/village and the school |
|---|---|---|---|---|
| 2. | x | x | 19 | Jászladány<br>Ferenc Móra Primary School of Jászladány |
| 2. | x | x | 14 | Nyírmártonfalva<br>Primary School of Nyírmártonfalva |
| 3. | x | x | 22 | Jászladány<br>Ferenc Móra Primary School of Jászladány |
| 3. | x | x | 20 | Győr<br>Miklós Radnóti Primary School of Győr |
| 3. | x | x | 14 | Fényeslitke<br>Lajos Kossuth Primary School of Fényeslitke |
| 3. | x | x | 19 | Baktakék<br>District Primary School of Baktakék |
| 4. | x | x | 15 | Fényeslitke<br>Lajos Kossuth Primary School of Fényeslitke |
| 4. | x | x | 12 | Nyírmártonfalva<br>Primary School of Nyírmártonfalva |
| 4. | x | x | 25 | Mezőszilas<br>László Németh Primary School of Mezőszilas |
| 5. | x | x | 17 | Farkaslyuk<br>Primary School of Farkaslyuk |
| 5. | x | x | 11 | Fényeslitke<br>Lajos Kossuth Primary School of Fényeslitke |
| 5. | x | x | 24 | Jászladány<br>Ferenc Móra Primary School of Jászladány |
| 5. | x | x | 17 | Baktakék<br>District Primary School of Baktakék |
| 5. | x | x | 30 | Mezőszilas<br>László Németh Primary School of Mezőszilas |
| 6. | x | x | 33 | |
| 6. | x | x | 17 | Farkaslyuk<br>Primary School of Farkaslyuk |
| 6. a | x | | 22 | Jászladány<br>Ferenc Móra Primary School of Jászladány |
| 6. b | | x | 22 | |

Questionnaires

*Appendix 3*

**Questionnaire**

**PRE – profile, all teachers**
**PRE – profile, participating teachers**

**General questions**

1. Age
2. Sex
3. Qualification
4. How many years have you been working as a teacher?
5. Do you use ICT tools in the classroom (a scale of 1-3)?
6. Do you have a smartphone?
7. Do you have a tablet?
8. Do you use a computer/laptop?
   yes, in school, regularly; yes, in school, but not regularly; yes, but only at home; yes, both in school and at home; I don't use a computer / laptop
9. The number of people who live in the town/village where your institution is
10. The number of students of the school that you represent
11. The number of classes in your school per grade
12. The number of students in the class in which you try out out or will try out the BOOKR software
13. In which class do you use or will you use the software in this school year?
    *BOOKR Suli – like index*
14. Have you had the opportunity to get familiar with the operation of the BOOKR Suli software yet?
15. Did you get familiar with the application in school settings or did you use the Storybook before?
16. When did you gain your first experience with BOOKR Suli?
17. What was the way to gain experience?
    I was informed about it via the BOOKR Suli website; the BOOKR Suli webinar; I received personal help; other
18. Who helped you learn how to use the app
    the administrator; one of my colleagues; a family member; my students; other?

19. Did you need technical assistance after getting familiar with the application interface later?
20. Do you think that in-service training is needed for teachers to get familiar with the new digital genre? (multiple choice)

    not necessary, the software is easy to use; not necessary because the material of printed and interactive books is essentially the same; yes, because I did not learn about digital reading teaching during my university/college studies; yes, because it requires complex knowledge of teachers to be able to use the software continuously in teaching and education; yes, but in-service course training cannot be conducted without financial support; yes, but due to my workload I can't attend the training course
21. How did you feel about getting the information that you would have the opportunity to use digital books in your lessons?

    I was happy about it, looking forward to it; I had mixed feelings; I had aversion to it; I was not happy about it all; other
22. Did you volunteer to try out the software?
23. How difficult do you think the interface is to use? (a scale of 1-5)
24. Do you think that teaching with an interactive book requires more preparation than teaching with a printed book?
25. Have you had the opportunity to actively use one of the interactive books of the application (operating the teacher administrative interface) in the classroom yet?
26. If you had the opportunity to use BOOKR Suli in the classroom, which class did you use it in?
27. Which book (s) did you use?
28. How many children used the book(s) mentioned above under your supervision?
29. Do you think students were happy about the presentation of the learning material on a digital medium in the classroom (a scale of 1-5)?
30. Did you experience differences in students' emotional reactions in terms of gender, age, sociological background, and so on?
31. How much do you think the application appealed to children? (a scale of 1-5)
32. I liked the BOOKR School app because…
33. I didn't like the BOOKR School app because…
34. Do you think students had difficulty using the software? (a scale of 1-5)
35. Did students ask you if they could use the app next time in class?
36. Did they ask you if they could take the tablet home?

*Appendix 4*

**Questionnaire**

**PRE – methodological principles, all teachers**
**PRE – methodological principles, participating teachers**

**Personal data**

1. Name
2. Institution
3. In which class are you currently teaching the subject Hungarian language and literature? (PRE – methodological principles, all teachers) / Data of the class(es) involved in your measurement (PRE – methodological principles, participating teachers)

**General methodological and didactic principles**

4. How often do you use the following teaching methods in your work? (a scale of 0-5)
   lectures, explanation, discussion-conversation, student presentations, illustration, project method, cooperative teaching methods, pair work, small group work, individual work, differentiation, role play, game simulation, homework, computer, internet, multimedia, competition (competitive) methods, test paper, students' oral presentation, home assignment-independent task, test, practical product (e.g. a piece of art, a piece of technology), product of project work, computer (online) tasks
5. How often do you use the following forms of assessment in your work? (a scale of 0-5)
   test paper, students' oral presentation, home assignment-independent task, practical product (e.g. a piece of art, a piece of technology), product of project work, computer (online) tasks
6. Which types of homework do you use?
   task from workbook, task from worksheet, task from textbook, short research or data collection option, individual work for longer research, small group work for longer research on one or two parts of the curriculum, preparing an oral presentation independently, preparing an oral presentation in small group, IT tasks requiring the use of ICT, other
7. Do you use differentiated instruction? (a scale of 0-5)
8. Do you consider differentiated instruction to be a good method? (a scale of 0-5)
9. How true do you think the following statement is for your work? I will give catch-up lessons to below-average students. (a scale of 0-5)

10. How true do you think the following statement is for your work? I will provide special support to above-average students with exceptional gifts to expand their knowledge. (a scale of 0-5)
11. In your opinion, what are the obstacles and challenges to applying the differentiated instruction? (multiple choice)

    I was not prepared for this task during teacher training; There is no time and opportunity to learn about the individual characteristics of children; It requires too much preparation; There are no appropriate teaching tools available (e.g. catch-up, talent development programs, workbooks); Large class size; Heterogeneous classroom composition; The input does not match the output; Kids don't like it, don't need it; It loosens discipline too much; It further increases the differences between students; My work environment does not look with favour on such aspirations; No time to organize work; The room is not suitable for group work; Other
12. In general, to what extent can students' individual interests be taken into account in the Hungarian language and literature lesson? (a scale of 0-5)
13. In your experience, what is the obstacle to taking individual interests into account? (multiple choice)

    I was not prepared for this task during teacher training; There is no time and opportunity to listen to individual opinions and experiences; Such an additional section of lesson requires too much preparation; There aren't any appropriate teaching aids (e.g. workbooks); Large class size; Heterogeneous classroom composition; The input does not match the output; Kids don't like it, don't need it; It loosens discipline too much; It further increases the differences between students; My work environment does not look with favour on such aspirations; The room is not suitable for group work; Other
14. I measure the development of students compared to their previous level. (a scale of 0-5)
15. I follow the development of classes. (a scale of 0-5)
16. If the knowledge of the students in the class does not reach the level needed to proceed, I will not go on with the curriculum. (a scale of 0-5)
17. I measure it comparing it to the performance of parallel classes regularly. (a scale of 0-5)
18. When choosing my teaching and assessment methods, I take into account the needs of children with different learning styles. (a scale of 0-5)
19. Do you follow the development of students in any way in addition to marks?

    With regular textual, written evaluation; With regular textual, oral evaluation; By giving marks regularly and monitoring their changes; Keeping records on student personal

development; Using standardized tests compiled outside of school; By regular use of a series of questions developed in our school, consisting mainly of questions to be explained (e.g. short essays); Regular use of multiple-choice and/or true-false tests created in our school; Based on student self-assessment; Based on regular evaluation of the learning material; Based on regular assessment of students' homework; Based on observing students' class work; Based on evaluating the learning process and recording experiences; Based on evaluating the collection of student work (e.g. portfolio, file folder); Based on colleagues' assessment (teachers of other subjects); Based on peer evaluation; Based on parents' feedback/information, Other

**Professional methodological principles**

20. Can any method of Hungarian language and literature lessons reduce the socio-economic and socio-cultural disadvantages in the learning community? (a scale of 0-5)
21. What method (s) do you use (or, if you have the opportunity, would you use) to do so?
22. To which extent do you take into account age-specific features when selecting texts from Hungarian language and literature textbooks? (a scale of 0-5)
23. How important is it that the stage of lessons teaching letters and abstraction lesson sections developing skills should be activity and experience-based? (a scale of 0-5)
24. In your work so far, to what extent have you been able to make the stage of lessons teaching letters and developing language skills activity and experience-based? (a scale of 0-5)
25. What has been an obstacle to implementation so far? (multiple choice)
    I was not prepared for this task during teacher training; There is no time and opportunity to implement an experience- and activity-based section of lesson; It requires too much preparation; There aren't any appropriate teaching aids (e.g. workbooks); Large class size; Heterogeneous classroom composition; The input does not match the output; Kids don't like it, don't need it; It loosens discipline too much; It further increases the differences between students; My work environment does not look with favour on such aspirations; The room is not suitable for group work; Other
26. How important is it that literary text analysis lessons should be activity and experience-based? (a scale of 0-5)
27. In your work so far, to what extent have you been able to achieve it? (a scale of 0-5)
28. What has been an obstacle to implementation so far? (multiple choice)
    I was not prepared for this task during teacher training; There is no time and opportunity to implement an experience and activity-based section of lesson; It requires too much

preparation; There aren't any appropriate teaching aids (e.g. workbooks); Large class size; Heterogeneous classroom composition; The input does not match the output; Kids don't like it, don't need it; It loosens discipline too much; It further increases the differences between students; My work environment does not look with favour on such aspirations; No time to organize work; The room is not suitable for implementation; Other

29. How often do you read aloud new literary texts to the class? (a scale of 0-5)
30. If you read aloud new literary works to the class, do you ask students to follow along the text with their eyes in their own textbook? (a scale of 1-4)
31. What other method do you use to present new text?
    a student reading aloud to the class; I only ask students to read the text silently; use of a technology device, and; other
32. How often do you ask students to read a text aloud? (a scale of 0-5)
33. Have you ever asked children to make drawings (illustrations) in literature lessons? (a scale of 1-4)
34. Do you use the pictures and illustrations of the textbook in the Hungarian language and literature classes? (multiple choice)
    No, because the illustrations in the textbook are usually of poor quality; No, because I focus on the text; No, because talking about the picture distracts children; No, because this task usually fails; No; Sometimes; Often because it provides methodological diversity; Often because it is easier for children to imagine what they have learnt; Yes, because it inspires children; Always; Other
35. Do you use other visual or aural illustrations in the Hungarian language and literature classes and if you do, how often? (a scale of 0-5)
    photography, motion picture, picture book, digital illustration, instrumental music, singing, tape recorder, CD, other digital reproduction of sound; other
36. Do you also assign recommended readings to individual students? (a scale of 1-3)
37. If you do so, what is the reason?
    If I assign them, I recommend that particular book to everyone; I give only talented, faster-paced students additional recommended reading; for practice, I give the weaker ones additional recommended reading for practice; I assign recommended readings at the beginning of the year or at the end of the previous school year; I depends on the pace and extent of implementing the curriculum, i.e. I assign new titles "on the fly"
38. Has a student ever asked you to recommend a book to him/her? (e.g.: what to read in the afternoon or during the summer holidays?) (a scale of 1-3)

39. Have parents ever asked you to recommend a book for their children to read? (e.g.: What should their child read in the afternoon or during the summer holidays?) (a scale of 1-3)
40. If you have already been asked to recommend a book (whether a parent or student), how much difficulty did you have selecting age-appropriate literature?

    None; Partly as recommending a book requires constant updating of information in contemporary children's literature; Significantly as recommending a book requires constant updating of information in contemporary children's literature; Significantly as recommending a book requires constant updating of information in contemporary children's literature and review; Partly because I only recommend classics; Other
41. If you want to expand or illustrate the literary curriculum, how easy it is for you to provide age-appropriate fictional works/books for your lessons?

    There is no time to analyse extracurricular books in class; Physically, it would be quite difficult to implement it; It is simple because we have a school library in the building; It is easy because we can get the books at a nearby library; I select from my own library; Other

*Appendix 5*

**Questionnaire**

**PRE – profile, students**

1. Institution
2. Student's code number
3. Class
4. Number of students in class
5. Sex
6. Are his/her cognitive abilities appropriate for his/her age (vocabulary, abstraction, attention and memory)?
7. Does the child have a literacy-rich home environment? (i.e. his/her vocabulary is appropriate for his/her age, literary language is not unknown to him/her, parents told/tell fairy tales to him/her at home, parents talk to the child; they have joint cultural experiences, the parents themselves read books)
8. Does the child own a smartphone?
9. How often do you think he/she uses it? (a scale of 1-5)
10. Do you know if he/she likes video games? (a scale of 1-5)
11. Does the student have specific learning disabilities?
    no; dyslexia; dyscalculia; dysgraphia; specific developmental disorder of speech and language; other
12. Does the student require special treatment?
    no; a highly talented student; a student with special educational needs (SEN); a student with integration, learning and behavioural difficulties
13. The student's overall academic achievement (grade) in the previous year (a scale of 1-5)
14. The student's overall academic achievement in Hungarian language (a scale of 1-5)
15. The student's overall academic achievement in literature (a scale of 1-5)
16. The student's overall academic achievement in visual culture (a scale of 1-5)
17. The student's overall academic achievement in music (a scale of 1-5)
18. The student's overall academic achievement in information technology (in the case of a lower grade student, it must be filled in if there is a subject preparing computer skills in the school) (a scale of 1-5)
19. The student's class activity (a scale of 1-5)
20. To what extent can the child be kept motivated in class? (a scale of 1-5)

21. How can he/she generally be kept motivated?

    by means of praise; with good grades; if he/she is given a task that matches his/her level of knowledge; if he/she is given a task below his/her level of knowledge; if he/she is given a task above his/her level of knowledge; by means of reprimand; through recognition in front of his/her peers; by assigning another task; curiosities (by arousing his/her curiosity); competitive situation; Other
22. Do you think the student likes to read? (a scale of 1-5)
23. Is the student's reading aloud expressive (for lower grade students: age-appropriate)? (a scale of 1-5)
24. Is his/her level of information processing (speech perception, speech comprehension, visual processing, sensorimotor skills, memory, attention and sequencing) appropriate? (a scale of 1-5)
25. What do you think the level of the student's reading comprehension skills is like? (a scale of 1-5)
26. What do you think the student's communication skills are like? (a scale of 1-5)
27. Are his/her basic learning skills (reading, spelling and numeracy skills) appropriate for his/her age? (a scale of 1-5)

*Appendix 6*

**Questionnaire**

**INTRA – tasks, *Who Ate the Raspberries*?, printed text**
**INTRA – tasks, *Who Ate the Raspberries?,* interactive book**

1. Segment the following strange sentence into individual words. Circle the letter of the correct answer. HedgehogSámueliseatingagrasssnakeathefootofthetreenow.

a) Hedgehog Sámuel is eating a grass snake for dinner at the foot of the tree now.

b) HedgehogSámuel is eating a grass snake for dinner at the foot of the tree now.

c) Hedgehog Sámuel is eating a grass snakeatthefoot of the tree now.

2. Segment the lines into verses. Circle the letter of the correct answer.

a)
Basket's full just like their belly,
For three small cubs, it is plenty,

No more problems at home now,
Mary has berries to chow.

Night is here, they are tucked in bed,
Three sleeping cubs, dreams in their heads.

Momma bear is weaving now,
That's how she keeps an eye out.

b)
Basket's full just like their belly,
For three small cubs, it is plenty,
No more problems at home now,

Mary has berries to chow.
Night is here, they are tucked in bed,
Three sleeping cubs, dreams in their heads.

Momma bear is weaving now,
That's how she keeps an eye out.

3. The lines are mixed up in the text; put them in the correct order. Circle the letter of the correct answer.

a)
"Here the bush is full of berries!"
Oh, they're so sweet, just like cherries.

The forest is very nice,
beech and birch trees fill their sight.

b)
The forest is very nice,
beech and birch trees fill their sight.

"Here the bush is full of berries!"
Oh, they're so sweet, just like cherries.

4. What event does the story of the poem begin with?

a) Aunt Bear is spinning.

b) Aunt Bear is cleaning up.

c) Aunt Bear is washing the clothes.

5. When does the plot begin?

a) at dawn

b) in the morning

c) in the evening

6. In the first three verses, which location of the story appears?

a) The raspberry forest.

b) The home of the bear family.

c) The pine forest.

7. What are the bear-cubs doing in the forest? Circle the letter of the correct answer.

a) They are looking for honey.

b) They are picking mushrooms.

c) They are picking raspberries.

8. Where were the characters when the bear-cubs visited them? Match the location with the right character. (In the INTRA – tasks, *Who Ate the Raspberries*?, according to questionnaire instruction in *the interactive book*, the task had to be performed in the app, on page 14.)

at the foot of the tree

in the den

in the forest clearing

in the kitchen of the foxhole

in the carrot field

at home

9. Circle the letter of the TRUE statements.

a) The bear-cubs were searching for the stolen raspberries among the bushes.

b) Hedgehog Samuel is eating beetles for dinner.

c) Thief Ferke is falling over on a tree trunk.

d) The squirrel chooses raspberries instead of pine seeds.

10. How many baskets are there in the story?

a) one: the one that belongs to the bear-cubs

b) two: the ones that belong to the bear-cubs and Thief Ferke

c) two: the ones that belong to the bear-cubs and the squirrel

d) three: the ones that belong to the bear-cubs, Thief Ferke and the squirrel

11. Match the pictures with the corresponding incomplete sentences. (*In the INTRA – tasks, Who Ate the Raspberries?,* according to questionnaire instruction in the *interactive book*, the task had to be performed in the app, on page 16.)

a) "… why are you searching for them in my house?"

b) "And lends them a …."

c) " One … is falling over."

d) " The evening is here, … made."

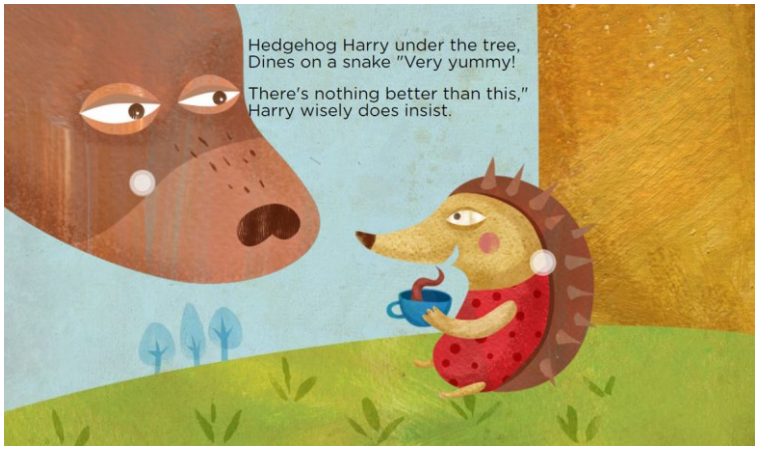
12. Read the sentences and match them with the appropriate picture. (*In the INTRA – tasks, Who Ate the Raspberries?,* according to questionnaire instruction in the *interactive book*, the task had to be performed in the app, on page 15.)

a) Bears like raspberries.

b) Mother bear is having a weekly washday.

c) There are three bear-cubs in the bear family.

13. Why can only the bear's head be seen in this picture?




What Ate the Raspberries?, page 9.

a) the bear is too big to fit the picture

b) because we see the animals too closely

c) the artist designed the picture badly

d) because the hedgehog is as big as the bear's head

14. List what is in the text that is not in the picture.

The forest is very nice,
beech and birch trees fill their sight.

"Here the bush is full of berries!"
Oh, they're so sweet, just like cherries.

Thorns are sharp, that's no problem,
Makes their fur shaggy on them.

Who ate the Raspberries?
from page 3

15. What kinds of animals are there in the story?

a) bear, fox, wolf, rabbit, owl, hedgehog, squirrel, grass snake

b) bear, rabbit, fox, hedgehog, grass snake, squirrel

c) bear, rabbit, parrot, fox, hedgehog, lizard, squirrel

16. Who says: "Here's the bush, here's the raspberry." "Oh, how sweet. Stuff it in your mouth."

a) the bear-cubs

b) Márika

c) the narrator

17. Read the lines carefully, compare them with the pictures. Circle the letter of the correct answer.

"Look now at who's running at us
It just might be that old thief Gus!"

Here comes trouble, here it comes!
He trips on a fallen trunk.
"Well, shall we go after the thief?"
"No, look here, raspberries so sweet!
So juicy, oh so yummy,
Pick while mom does the laundry."

Who Ate the Raspberries?, page 5, series of pictures

a) Picture 1 shows exactly what the poem says

b) Picture 2 shows exactly what the poem says

c) the first two pictures show exactly what the poem says

d) Picture 3 shows exactly what the poem says

e) the three pictures show together what the poem says

f) the pictures do not show together, either, what the poem says

18. Choose the correct statement.

a) The poem is about the bear mom asking the bear-cubs to go and pick raspberries for their little sister. They do so, but the Thief Ferke steals the raspberry basket.

b) The poem is about the bear-cubs who want to pick raspberries for their little sister. Thief Ferke steals their basket full of raspberries, but in the end the story ends well.

c) The poem is about the bear-cubs who want to pick raspberries for their little sister, but the animals of the forest, Paul Rabbit, Mrs Fox and Hedgehog Samuel steal the basket full of raspberries with the help of Thief Ferke and eat the raspberries.

19. What does *"The pine forest doesn't hide the ones who have sticky hands"* mean?

20. What does *They beat the bush* mean?

**Subjective opinion**

21. Did you like being able to read the tale on a tablet? (a question in *the INTRA – tasks, Who Ate the Raspberries?, interactive book* questionnaire)

22. Did it help you to understand the story that you could read it on the tablet? (a question in *the INTRA – tasks, Who Ate the Raspberries?, interactive book* questionnaire)

*Appendix 7*

**Questionnaire**

**INTRA – tasks, The Tale of the Green Pig, printed text**
**INTRA – tasks, The Tale of the Green Pig, interactive book**

1. Segment the sentence into individual words. Circle the letter of the correct answer.
Inwinterandsummerhelivedthereinspringandautumnhealsolivedtherehewalkedoutfromthereinthe morningreturnedthereatnoonandintheeveningtheforestdwellerssawhisbluecoatappearanddisappea rthereeveryday.

a) Inwinterandsummer he lived there, in spring and autumn he also lived there, he walked out from there in the morning, returnedthere at noon and in the evening, the forest dwellers saw his blue coat appear anddisappear there every day.

b) In winter and summer he lived there, in spring and autumn he also lived there, he walked out from there in the morning, returned there at noon and in the evening, the forest dwellers saw his blue coat appear and disappear there every day.

2. What do we get familiar with at the beginning of the story? Circle the letter of the correct answer.

a) the house of the Green Pig
b) the house of the Blue Pig
c) a gang of the Bacon brothers

3. Find the odd one out. Which location doesn't fit the story of the Green Pig?

a) the land of the bearded oaks
b) the ravine
c) the district of lakes

4. Find in the text what forest animals got acquainted with the Green Pig.

a) the Rabbit, the Owl, the Deer, the Bear
b) the Raven, the Wolf, the Woodpecker, the Bee
c) the Owl, the Ant, the White Butterfly, the Stag-Beetle

5. Pick out the magical characters of fairy tales.

a) Hawthorn, Yellow Pebble
b) the White Butterfly
c) Flame-tongued, six-legged dogs

6. Find in the text: what an exceptional ability does the Spiky Pig have?

a) unfriendly

b) a trickster
c) scary

7. Find it in the text: who was called Wild Boar in the tale behind his back?

a) the Spiky Pig
b) the Blue Pig
c) the Green Pig

8. Count: in which paragraph, on which page can you read about this? (*INTRA – tasks, The Tale of the Green Pig*, number of page and paragraph in the printed text worksheet / *INTRA – tasks*, *The Tale of the Green Pig*, number of page and paragraph in the interactive book worksheet)

a) Page 2, paragraph 3 / Page 3, paragraph 7
b) Page 1, paragraph 2 / Page 5, paragraph 1
c) Page 4 Paragraph 4 / Page 17 Paragraph 2

9. Why do you think the Blue Pig helped the Green Pig?

a) Because he had a good heart.
b) Because he was afraid of the Green Pig.
c) Because he hoped for a reward from the Green Pig.

10. What problem did the Green Pig face when he was attacked by the Bacons?

a) He couldn't find his dotted rifle.
b) The Bacon brothers were too many.
c) He couldn't sneak out of his house.

11. Count: in which paragraph, on which page can you read about this? (*INTRA – tasks, The Tale of the Green Pig*, number of page and paragraph in the printed text worksheet / *INTRA – tasks*, *The Tale of the Green Pig*, number of page and paragraph in the interactive book worksheet)

a) Page 5, paragraph 1 / Page 3, paragraph 7
b) Page 1, paragraph 1 / Page 5, paragraph 1
c) Page 3, paragraph 1 /Page 11, paragraph 1

12. Who says that? "Shall I tell you why the Green Pig wears a blue coat?"

a) the Spiky Pig
b) the Blue Pig
c) the narrator

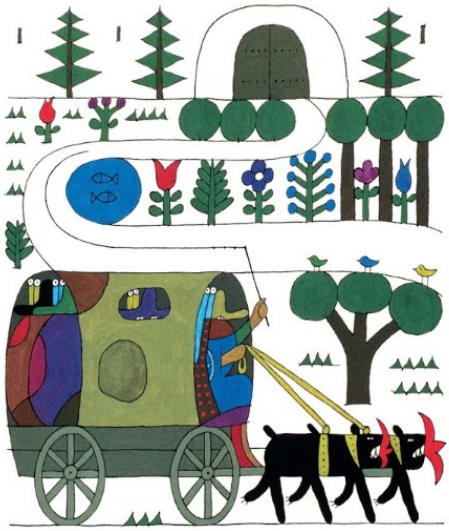
13. How many times does the house of the Green Pig appear in the story?

a) Once: when the Bacons attack the Green Pig in his home.
b) Twice: when the house is presented and when the Green Pig is attacked by the Bacons.
c) Three times: when the house is presented and when the Green Pig is attacked by the Bacons and when the Green Pig welcomes his friends.

d) Three times: when the Green Pig is woken up, when the Green Pig is attacked by the Bacons and when the Green Pig welcomes his friends.

14. List what is in the text that is not in the picture?

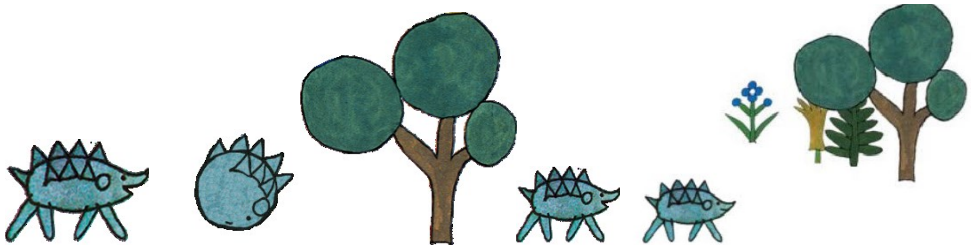
"It happened once long ago, yesterday or the day before yesterday or before that a gang of robbers arrived in the land of the bearded oaks. They came from the neighbouring province in a cart, tired and hungry, took shelter in the ravine. The cart was pulled by two black dogs, their tongues were like flames, and each had six legs."



The Tale of the Green Pig, page 5

15. Read the passage below carefully and circle the letter of the correct answer. If you think more than one answer is correct, you can circle more than one letter.

"Well, the trickster Spiky Pig or Hedgehog slyly crouched under the Hawthorn, but when the robbers disappeared, he slipped out from under the bush and headed for the round forest."



The Tale of the Green Pig, page 14, parts of the picture series

a) Picture 1 shows most accurately what the passage says.
b) Picture 2 shows most accurately what the passage says.
c) The first two pictures show most accurately what the passage says.
d) Picture 3 and 4 together show most accurately what the passage says.
e) All four pictures show most accurately what the passage says.

16. The Bacon brothers are led by Bacon I. How do we know this? Circle the letter of the correct answer. If you think more than one answer is correct, you can circle more than one letter.

a) He gives orders and fights most persistently.
b) Only he has a three-barrelled rifle.
c) He forces his way into the Green Pig's house through the door.
d) He forces his way into the Green Pig's house through the chimney.

17. Look at the picture carefully; is it true that only the face of the first robber can be seen in this picture? If you think more than one answer is correct, you can circle more than one letter.

The Tale of the Green Pig, part of the cover

a) True, because the other robbers pulled their necks in.
b) True, because the others overlap each other.
c) The face of the first robber is not visible, it is behind a mask.
d) The face of the first robber is not visible; he is hiding behind a flower.
e) True, because we are closest to him.
f) True, because he is the leader of the robbers.

18. Put the events in the sentences in chronological order.

When it got dark, the Bacons attacked the Green Pig.
The Blue Pig chased the Bacons away and handed the blue coat to the Green Pig.
The Hedgehog set off to visit the Blue Pig.
The Green Pig gave signals for someone to come and help him.
A gang of robbers arrived in the land of the bearded oaks.

19. What is true about the Bacons?

a) their faces cannot be seen
b) their hands and feet cannot be seen
c) they wear a loose cloak
d) their faces can be seen
e) there are eight
f) each of them has a rifle

g) they came on foot to the land of the bearded oaks
h) their cart is pulled by 6-legged, flame-tongued dogs

20. I didn't always write the truth about the Hedgehog. Can you find where I skewed the truth? Underline it.

The letters t.e. stood after the name of the Hedgehog or Wart-Hog. And that means he had twinkling eyes. He got this name because he served in the Forest Army. When he heard that the Green Pig was in trouble, he knew immediately what to do. He stirred his stumps and just found himself at the house of the Blue Pig.

21. Complete the sentences with the words given. Be careful, there is an odd one out.

Green Pig had all parts of his body ……., even his tail.
There was a great deal of alarm in the land of the …….. oaks when the gang of robbers arrived.
The Hedgehog got out from under the bush and headed for the…… forest.
In the Wild Boar's house everything was …….
The Blue Pig's …….. tusk shone like a silver sword in his mouth.
a) enormous
b) round
c) white
d) blue
e) green
f) bearded

22. Briefly describe how the fight between the Blue Pig and the Bacon brothers took place (name who took part in the fight and what they did)

23. Who do you think the protagonist of the story is and why?

24. Explain how you were able to help the characters in the fairy tale when reading the interactive book. (a question in the questionnaire *INTRA – tasks, The Tale of the Green Pig interactive book*)

25. Do you think it's a good thing that you can intervene in the tale and that you can help the characters? (a question in the questionnaire *INTRA – tasks, The Tale of the Green Pig interactive book*)

**Subjective opinion**

26. Did you like being able to read the tale on a tablet? (a question in the Questionnaire *INTRA – tasks, The Tale of the Green Pig interactive book*)

27. Did it help you to understand the story that you were able to read the story on a tablet? (*INTRA – Tasks, The Tale of the Green Pig*, a question in *the interactive book* questionnaire)

*Appendix 8*

**Questionnaire**

**INTRA – tasks, Family Circle, interactive book**

1. Read the first two verses; in which line does the change of location take place?

a) 8
b) 12
c) 16

2. Identify the parts of the text which refer to the significance of the events told by the crippled soldier by giving the number of the verses and the lines of the verses.

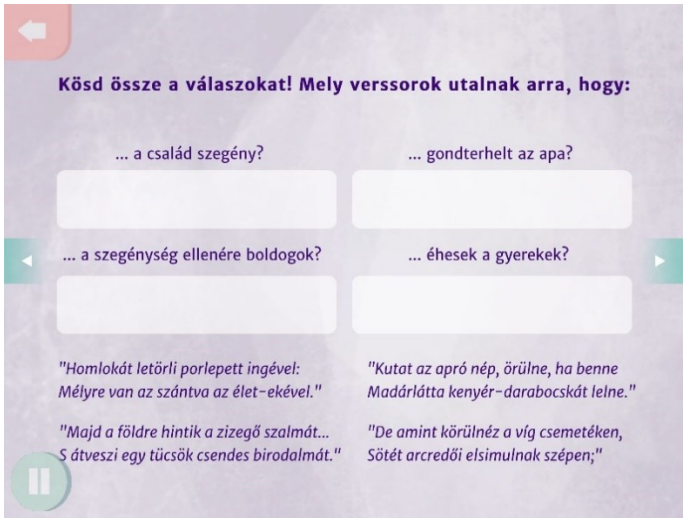
3. How many times does the young girl appear in the poem? Circle the letter of the correct answer.

a) Once: When she throws twigs upon the fire and then she warms her iron.
b) Twice: When she milks the cow, when she throws twigs upon the fire and then she warms her iron.
c) Three times: When she throws twigs upon the fire and then she warms her iron, when he opens the door for the crippled soldier, and when she asks the guest about her brother.
d) Four times: At the former three events and when she serves her father the food.

4. Arrange the animals in the poem in chronological order. (The task had to be performed in the application on page 21.)


Family Circle, page 21

5. Match the answers; Which lines of verse refer to the fact that (…)? (The task had to be performed in the app on page 20.)




Family Circle, page 20

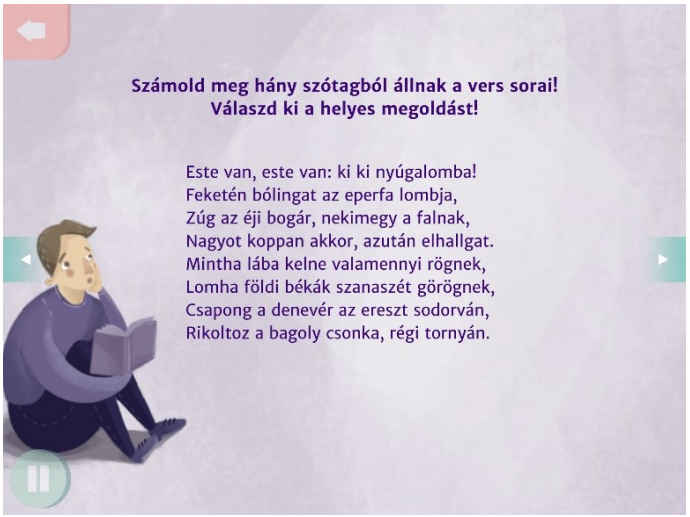
6. What does the figure of speech "*with dusty shirt-sleeve wipes a wearied brow that has been deeply furrowed by life's cares"* express in the poem?

a) The head of the family is old; this is why his face is wrinkled.
b) He has had to deal with many tough situations in his life so far to be able to support his family.
c) He was injured several times during work, so his skin was scarred.

7. What does the figure of speech *"the young girl (…..) a morning star"* refer to?

a) she is the oldest of the children
b) she is diligent working from dawn to dusk
c) she is as beautiful as the morning star

8. Count how many syllables the lines of the poem consist of. Choose the right answer. (The task had to be performed in the app on page 19)




Family Circle, page 19

9. List what is in the text that is not in the picture.

Family Circle, part of page 11

Their hunger is sated from the bountiful bowl,
And their thirst is quenched by a pitcher that is full,
Words are rare while they are sharing their humble meal,
That's the custom of the Hungarian people.

10. How do we know that the father brought a little rabbit in his satchel for the kids? If you think that there is more than one answer, you can circle more than one letter.

a) based on the verse text
b) based on the still image
c) from the sound effects
d) based on the animation
e) based on interaction with the book

11. Choose the best answer from the options given below: which are the first two lines of the verse? (The task had to be performed in the app on page 18.)


Family Circle, page 18

12. Based on your answer to the previous task, describe in a few words what images these lines of the poem evoke in you.

13. Read page 2 of the app ("*The evening comes and everything is hushed* ...") again. Describe what interactions contributed to creating the mood and atmosphere of the poem.

14. Start the app again, read page 8 ("*The father says "Good Evening" to them all*, ..."). Describe what interactions helped you to read the poem.

15. List where and in what cases the various elements (sound, movement, image and text) in the interactive book contribute to the creation of the mood and atmosphere of the poem at the beginning.

16. Describe how the app will help you understand the meaning of the word "*chew its cud*".

17. Match the movements that appear in the poem to the animals. (The task had to be performed in the app on page 17.)


Family Circle, page 17

**Subjective opinion**

18. Circle the number that best expresses how much you liked the interactive book version of the poem. 1 means I didn't like it, 5 means I liked it very much. (a scale of 1-5)

19. Circle the number that best expresses how much you were able to direct the story on your tablet. (a scale of 1-5)

20. Did being able to read the poem in the interactive book help you understand the story? (a scale of 1-5)

*Appendix 9*

**Questionnaire**

**POST – post-survey experience, all teachers**
**POSZT – post-survey experience, participating teachers**

**Personal data**

1. Name
2. Institution
3. a) Classes included in the survey by you

   b) In how many lessons did the class you surveyed in the pilot use BOOKR Suli books in the past? (*POST– survey experience, a question included in the questionnaire of participating teachers*)
4. a) Which BOOKR Suli books did you use in the survey?

   b) Did you teach a class using the printed text or an interactive book during the pilot? (*POST – survey experience, a question included in the questionnaire of participating teachers*)

**General experience**

5. Were you motivated to be able to use an interactive book in the classroom? (a scale of 1-5)
6. Did you have any difficulty incorporating the interactive book into the classroom during the pilot? (a scale of 1-5)
7. Why?
8. Based on your experience so far, would you have difficulties in the methodological-theoretical integration of interactive books into the classroom in the future (i.e. preparing lesson plans similar to the sample lesson plan)? (a scale of 1-5)
9. Why?
10. What can best help teachers to integrate interactive books into the classroom? (multiple choice)

    preparations at home; practice; sample lesson plans; course; integration into teacher training; textbooks; online forum; collegial cooperation in the school; students' experience in using tools; other
11. How many lessons do you think are needed in order for you to routinely take advantage of the professional-pedagogical opportunities provided by interactive books in the classroom? (a scale of 1-5)
12. From the date that the devices arrived at the institution, was there enough preparation time for you to use the interactive book seamlessly during the pilot lesson? (a scale of 1-5)

13. Why?
14. Did your environment reflect on your using an interactive book in your lessons? If so, who? Was your reflection positive or negative? (a scale of 1-3, optional answer)
    the headmaster; a colleague teaching Hungarian language and literature, a colleague teaching information technology; a colleague teaching another subject; parents; children from other classes; the local government of the town/village; a colleague teaching in another school in the town/village

**Professional and methodological experience**

15. What types of text do you think an interactive book would be suitable for analysing? (multiple choice)
    texts providing experience for students; texts providing knowledge; historical texts; informative texts
16. In your experience, in which type of lesson can interactive books best used?
    a lesson presenting new content, revision lesson, all kinds of lessons
17. What do you think about the number of interactions in the interactive book you used in the pilot lesson?
    there are a lot of interactions in it; there are few interactions in it; there are enough interactions in it, I cannot judge it
18. What is your opinion about the type of interactions, i.e. modalities (one tap, two taps, drag, word explanation link)?
    there is a diverse set of modalities in it; there are few modalities; there are enough modalities in it; I cannot judge it
19. To which extent do the Interaction Series of the BOOKR Suli books serve the purposes of teaching and learning and those of gaming? (a scale of 1-5)
20. To which extent do the tasks at the end of the BOOKR Suli's books serve purposes of teaching and learning and those of gaming? (a scale of 1-5)
21. Are the levels of reading comprehension below strengthened or weakened by the application? (a scale of 1-5)
    literal comprehension; interpretive comprehension; critical comprehension; creative comprehension;
22. In your opinion, in which stages of the lesson can the BOOKR Suli app used during the procedure? (multiple choice)
    during tuning-in, during meaning-making; during reflection
23. Do interactive books help students to formulate the central idea of the text?

as much as a printed book; better than a printed book, less than a printed book

24. Does the app help or hinder the implementation of the following types of learning environments? (a scale of 1-5)

    co-operative; social; learning from each other

25. In what form of work and to what extent do you find the application effective? (a scale of 1-5)

    frontal; individual work; pair work (children with different abilities); pair work (children of the same ability); group work

26. Is BOOKR Suli suitable for differentiating between children with different learning styles? (a scale of 1-5)
27. To what extent do the BOOKR Suli apps allow students' individual interests to be taken into account? (a scale of 1-5)
28. Can the use of the BOOKR Suli app reduce the socio-economic and socio-cultural disadvantages in the learning community? (a scale of 1-5)
29. To what extent does BOOKR Suli allow Hungarian language and literature lessons to be activity and experience-based? (a scale of 1-5)
30. What do you think about the fact that the app also has a voice-reading feature? (multiple choice)

    It is suitable for presenting new text; It is good that students can follow along the text with their eyes during the reading, It is good because the actor's reading the text replaces the teacher's reading it aloud; It is good, but actor's reading does not replace the teacher's reading it aloud; I don't think it is good; I will use this feature only to a limited extent; I won't use this feature

31. Are you planning to use the pictures and illustrations of BOOKR Suli's interactive books in your Hungarian language and literature in the future?

    no, because illustrations in interactive books are usually of poor quality; no, because I focus on the text; no because talking about the picture distracts children, no because this task will fail, no; sometimes; often because it provides methodological diversity; often because it makes it easier for children to imagine what they have learned, yes, because it inspires children, always, other

32. In the future, will you also assign recommended readings "tailored to individual students" by using the app?
33. Why?

if I assign them, I recommend that particular book to everyone; I give only talented, faster-paced students additional recommended reading; for practice, I give the weaker ones additional recommended reading for practice; I assign recommended readings at the beginning of the year or at the end of the previous school year; I depends on the pace and extent of implementing the curriculum, i.e. I assign new titles "on the fly"

34. Are you planning to use the app to monitor student progress in the future?
35. In what percentage of Hungarian language and literature lessons per year would it be advisable to present the curriculum by means of an interactive book?

**Experience related to student performance**

36. a) How many lessons do students need to have in order for a class as a whole to be able to use an interactive book routinely?

    b) Did gaining experiences with the interactions of the trial app ensure that the app runs smoothly during the pilot class? (*POST-survey experience, a question included in the questionnaire of participating teachers*)
37. After the lesson, did students ask you to let them use BOOKR Suli app in a literature class later as well?
38. Did the use of the interactive book have an impact on the atmosphere of the lesson?
39. Why?
40. Did the use of the interactive book have an impact on the classroom behaviour of the majority of students?
41. If it did so, how? (multiple choice)

    activity was increased; activity was weakened; motivation for the task was increased; motivation for the task was weakened; students' desire to communicate increased; students' desire to communicate decreased; discipline improved; discipline deteriorated
42. Did the pace of work of the majority of students change as a result of using interactive books? (a scale of 1-4)
43. Did the use of the interactive book affect the attention of the majority of students?

    no; the sustainability of directed attention (focusing on one thing) increased; the sustainability of directed attention (focusing on one thing) decreased; the sustainability of shared attention increased; the sustainability of shared attention decreased
44. Were boys or girls more motivated to use interactive books?
45. Were students with higher or lower academic achievement more motivated by interactive books?

46. Were students who read well or those who read poorly more motivated by interactive books?
47. Were children raised in literacy-rich or literacy-poor environment more motivated by interactive books?
48. Were students who were in the group using the tablet during the data collection happy about being given a task to complete digitally?
49. Were students who were in the "paper-based group" during the data collection happy about being given a task to complete in the traditional way? (*POST – survey experience, aquestion included only in the questionnaire of participating teachers*)
50. Do you think it was difficult for children to switch between media (i.e. to read and perform tasks on paper, in writing and on tablets digitally)? (*POST –survey experience, a question included only in the questionnaire of participating teachers*)

*Appendix 10*

**Questionnaire**

**POST - post-survey experiences, students**

**Subjective user experiences**

1. a) Did you like being able to read the tale on a tablet (*Questions of the questionnaire for grade 2 – Who ate the raspberries?; and grade 3-4 – The Tale of the Green Pig*)
   b) How much did you like the interactive book version of the poem? (a scale of 1-5) (*A question in the questionnaire for grade 6 – Family Circle*)
2. a) Did it help you understand the story that you could read the story on a tablet? *(Questions of the questionnaire for grade 2 –Who ate the raspberries?; and grade 3-4 – The Tale of the Green Pig)*
   b) How much did it help you help to understand the story that you could read the poem on a tablet? (a scale of 1-5) *(A question in the questionnaire for grade 6 – Family Circle)*
3. How much could you control the story on the tablet? (a scale of 1-5) (*A question in the questionnaire for grade 6 – Family Circle)*

**Technological environment**

4. Do you own a smartphone?
5. Does anyone in your family have a tablet?
6. Do you have a computer at home?
7. How often do you use your phone?
8. If you have a tablet, how often do you use it?
9. If you use a computer at home, what do you use it for?
   playing, learning, watching movies, listening to and watching tales and, I don't use it, other
10. If you use a smart device (phone or tablet) at home, what do you use it for?
    playing, learning, watching movies, listening to and watching tales and, I don't use it, other

*Appendix 11*

**Reflections of teachers**

"The lesson was a positive experience for both the students and me. They performed two of the revision tasks and I also surveyed the technology environment with the questionnaire. They then listened to the poem and then everyone performed the tasks on the tablet at their own pace. The students handled the tablet well despite the fact that some students do not have any smart devices at home. Almost all of the children are disadvantaged, or are cumulatively disadvantaged, and there are many students with special education needs and with learning and behavioral difficulties among them. I was very happy that no one felt that the lesson failed, they worked actively all the way through and said afterwards that they were having a good time. And I think that's very important too!
Thank you for the opportunity to try out this app!"

"Thank you so much for being able to participate in this research with my class and try out the BOOKR School app. I was a little scared to deliver a lesson with the tablet, but it soon became clear that I had nothing to fear because the interface was easy to use for both teachers and students. Eventually, we got so involved in tablet use, and the kids also enjoyed the interactive tales so much that in addition to the obligatory poem, we also watched other tales in the Hungarian language and literature lessons. Huge congratulations to the developers for this high quality work."

"Thank you so much for the opportunity, a lot of children performed on the tablet above their own level, but unfortunately, in the case of the paper-based questions, they performed as usual. I hope there will be more and more alternatives between books and literary works as soon as possible, because it is a great innovation, and the kids are already looking forward to the next "Rabbit class." (I usually put logos on display when we have an introductory or problem-solving class!"

"In my class there are students with a wide range of skills and abilities (talented, hyperactive, with dyslexia, dyscalculia and dysgraphia), so I place particular emphasis on differentiated instruction. It's great that BOOKR Suli also considers it important, and the tales are printed with a special dyslexia-friendly font and also have a syllable-based version. The kids really enjoyed using the app, much better than it had been if they had processed the text in print. The interactive tales captivated the attention of hyperactive students as well, they liked it that they were able to become part of the story due to the interactions, and all of them completed the tasks as well. It would be great if we had the opportunity to use the app in the future as well, because I find it extremely useful in helping SEN students to catch up.

## Fictional texts and illustrations of the interactive books used in the measurement

*Appendix 12*

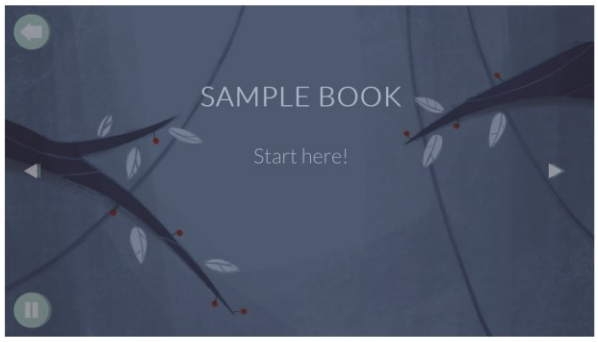
**Text excerpts and illustrations in the Sample book (by Ágnes Bertóthy)**

*The Fox and the Raven*

by Ildikó Boldizsár after La Fontaine
excerpts

The crow listened to the fox happily. He thought to himself:
"I really am beautiful. I will open my wings to show the fox my shiny black feathers."

"I love your black feathers and strong beak. Your legs are nice and long."
The fox bowed to the crow and said: "You should be the king of the birds!"






*Appendix 13*

**Ágnes Nemes Nagy**
***Who ate the raspberries?***

Momma bear plans to wash today
Her two cubs want to know if they:
"While you're washing, swishy-swash
can we pick some berries, mom?"

Raspberries, are what they're after,
For their sister, Mary's laughter.
The forest is very nice,
beech and birch trees fill their sight.

"Here the bush is full of berries!"
Oh, they're so sweet, just like cherries.
Thorns are sharp, that's no problem,
Makes their fur shaggy on them.

Basket's full just like their belly
For two small cubs, it is plenty
They lay down under the branch
"The basket's in someone's hand!"

They get up from all the noises
Looking here and there for voices
"Oh no, where is our basket?"
Ears stood up from the racket.

You cannot hide behind the leaves,
the forest shows us all thieves.
The two bear cubs run around,
beating bushes to the ground.

"Let's look around near the rabbit!"
He eats carrots, that's his habit,
he likes cabbage pieces too,
grates them up when in the mood.

Mrs. Fox says to the young bears,
"Why do you think that I would dare?"
You know I prefer wild geese
over any raspberries!

Hedgehog Harry under the tree,
Dines on a snake "Very yummy!
There's nothing better than this,"
Harry wisely does insist.

"Squirrel, squirrel, do you have the
berries we lost, up in the tree?"
"Berries? Never, seeds and bugs
are what I like. Oh! And nuts!"

Squirrel Scott is a nice chappie,
He makes the cubs very happy,
when he runs down to the ground,
lends a basket he has found.

"Look now at who's running at us
It just might be that old thief Gus!"
Here comes trouble, here it comes!
He trips on a fallen trunk.

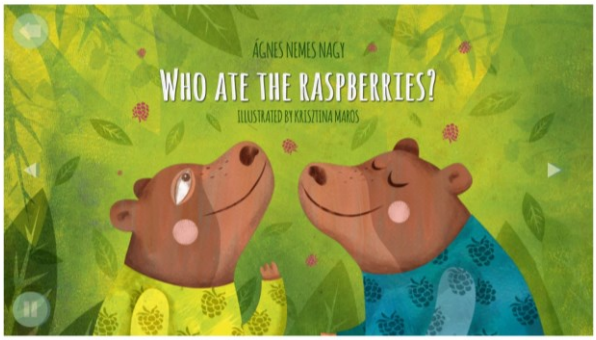
"Well, shall we go after the thief?"
"No, look here, raspberries so sweet!
So juicy, oh so yummy,
Pick while mom does the laundry."

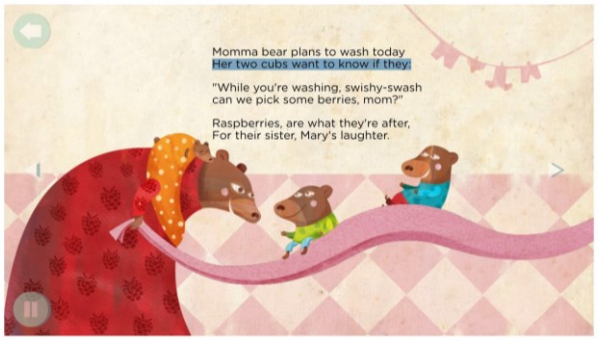
Basket's full just like their belly,
For three small cubs, it is plenty,
No more problems at home now,
Mary has berries to chow.

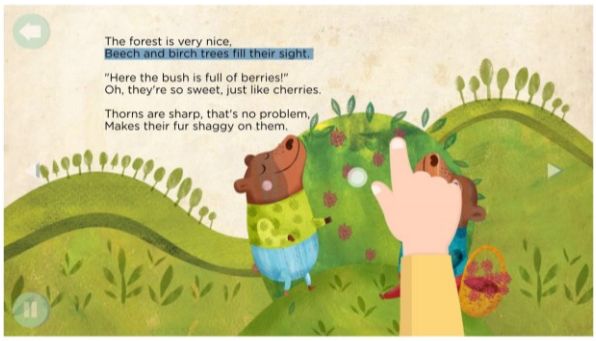
Night is here, they are tucked in bed,
Three sleeping cubs, dreams in their heads.
Momma bear is weaving now,
That's how she keeps an eye out.

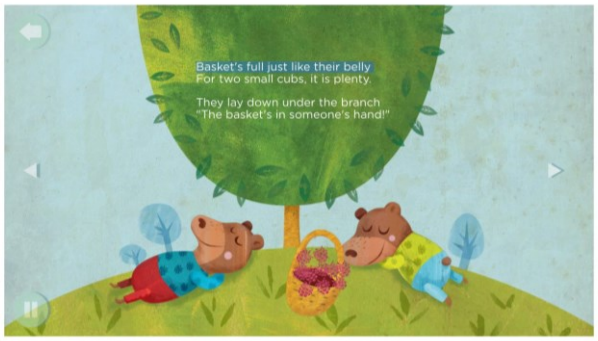
*Appendix 14*

**Illustrations for the interactive book *Who Ate the Raspberries?* (by Krisztina Maros)**








Hedgehog Harry under the tree,
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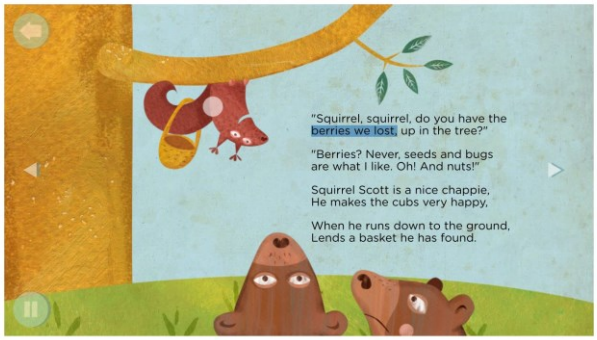
"Squirrel, squirrel, do you have the
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"Berries? Never, seeds and bugs
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When he runs down to the ground,
Lends a basket he has found.


"Look now at who's running at us,
It just might be that old thief Gus!"
Here comes trouble, here it comes!
He trips on a fallen trunk.
"Well, shall we go after the thief?"
"No, look here, raspberries so sweet!
So juicy, oh so yummy,
Pick while mom does the laundry."


Basket's full just like their belly,
For three small cubs, it is plenty,
No more problems at home now,
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Night is here, they are tucked in bed,
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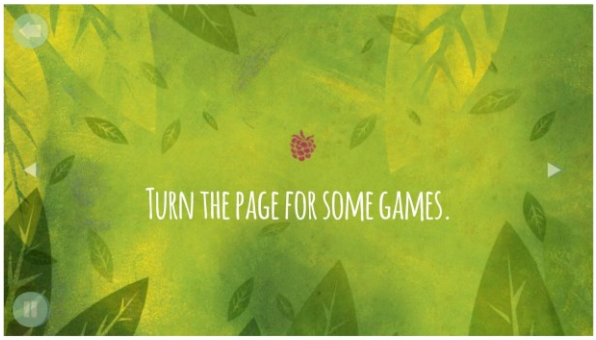
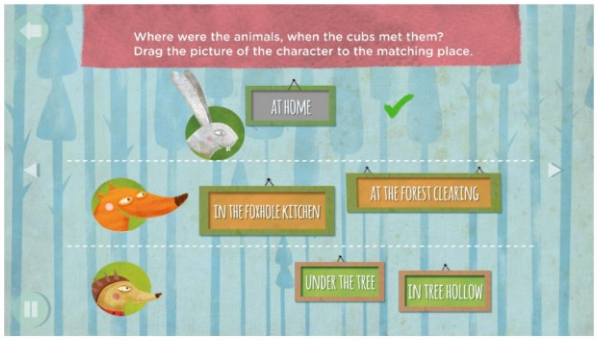
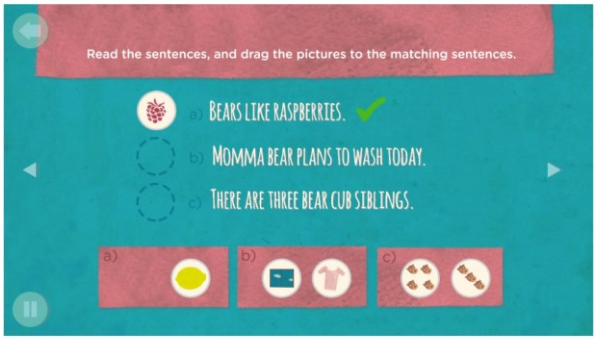

TURN THE PAGE FOR SOME GAMES.


Where were the animals, when the cubs met them?
Drag the picture of the character to the matching place.
AT HOME
IN THE FOXHOLE KITCHEN
AT THE FOREST CLEARING
UNDER THE TREE
IN TREE HOLLOW


Read the sentences, and drag the pictures to the matching sentences.
a) BEARS LIKE RASPBERRIES.
b) MOMMA BEAR PLANS TO WASH TODAY.
c) THERE ARE THREE BEAR CUB SIBLINGS.


DRAG THE PICTURES TO THE CORRECT GAPS IN THE SENTENCES.
"No, look here, ... season!"
"Hands a ... they can borrow."
"He trips on a ... "
"Night is here, ... "

*Appendix 15*

**Béla Horgas**

***The Tale of the Green Pig***

Did you hear the story of the Green Pig? Did you ever see it?

Once upon a time, in a land near and far, there lived a pig. Her ears were green, and so were her legs, her back and her little tail – all covered in green. Everyone called her the Green Pig. Who is this Green Pig? You're probably thinking.

In the great forest, in the land of bearded oaks lived the Green Pig in a house made of roots. She lived there in summer and winter, and spring and autumn as well. She left there every morning, dressed in a blue coat, and returned there every noon and night. The Owl, the Ant, the Moth and the Beetle knew her well, and the Thistle and the Ash Tree often saw her, and so did the Hawthorn and Yellow Stone. They knew her routine well, her walk and her talk, and her green locks and blue coat, but only the older ones knew that the Green Pig didn't always wear a blue coat.

So why does the Green Pig wear a blue coat? You may wonder.

It happened years ago, or yesterday, the day before, or the day before that, that a band of robbers arrived at the land of bearded oaks. They traveled by carriage from the neighboring country, they were hungry and tired and made camp in the riverbed. The carriage was drawn by two black dogs, each with six legs and their tongues like flames. The Owl had many strange dreams, and Yellow Stone saw a lot of things before, but neither of them ever saw animals like these dogs. Robbers, they met before. But flaming-tongued, six-legged dogs? They scared everyone in the land of bearded oaks. It would have scared them even more to know that they were after the Green Pig! Not to mention, they weren't just regular old robbers you meet in other tales… They would have panicked if they knew that the band of infamous Bacon brothers set up camp in their woods.

Just who are the Bacon brothers? You might ask.

As in any proper band of robbers, there were seven of them, named Bacon I, Bacon II, Bacon III, Bacon IV, Bacon V, Bacon VI and Bacon VII. These robbers very strange. Their face, hands and legs were invisible, or maybe they had no face, hands or legs at all! They all wore big hats and long capes – pig-catching capes! – and carried rifles and pistols, some with three barrels, and some with just two, but no matter how many barrels, all of their guns were covered in red and white spots.

The robbers laid all day in the riverbed while the dogs rested underneath the bushes. No sounds could be heard, except the hissing of flames on the dogs' tongues.

The Green Pig took a nap after lunch, then got up and took a walk around the Ash Tree to collect some acorns, and then strolled back home. It was just like any other day to her, and everything seemed to be alright. If someone wanted to ask her why she was so calm, the Green Pig would reply:

"Why wouldn't I be calm? Did something happen?"

But no one asked the Green Pig any questions, and no one warned her about anything, because no one really knew what was going to happen in the land of bearded oaks.

After dark, the robbers made a fire. It was easy! All they did was collect three dry branches and some grass, then Bacon I whistled and his dog came running and licked the pile of wood, which caught on fire immediately. Then, Bacon I whistled again and all the other Bacon brothers gathered around the fire and they cooked up a plan.

Are you excited to hear the Bacon brothers' plan?

This plan, just like any other plan, was a simple one, easy to remember and easy to do. The Bacon brothers learned it right away and got to work: Bacon I and Bacon II aimed through the door, Bacon III and Bacon IV looked through the window, while Bacon V aimed down the chimney, and Bacon VI and Bacon VII pointed their guns through little cracks between the roots, straight at the Green Pig.

What was a green pig to do? Not just any green pig, but the Green Pig herself, with all the Bacon brothers around her. What should she do, when attacked from seven different directions? Cry for help!

So, the Green Pig cried for help. To let the creatures of the land of bearded oaks, the birds, the ants, the moths and the bugs, the thistles and bushes, and stones know that the robbers are here, they have come and decided to kidnap the pig – she cried:

"Help! Help!"

But everyone in the forest was in a deep sleep, and no one answered the Green Pig's cry. The Green Pig knew that she had friends in the forest and hoped that they would hear her cry for help even if they were sleeping. If someone wanted to ask the Green Pig who she thought of when the pig-catching cape-wearing robbers tried to take her away, she would say:

"I thought of my friend, of course. Where would I be without a friend, a buddy of the same kind?"

Is it time to find out who the Green Pig's friend is?

The Green Pig's friend was called Spiky Pig or Porcupine. He laid under the Hawthorn, near the Moth and the Beetle, and saw everything and heard everything. He saw the Bacon brothers tie up the Green Pig by her legs, and he saw them put a stick between the rope and carry her to their carriage and THUMP! CRACK! WHOOSH! – With that, the six-legged, flaming-tongued dogs were up and away!

The Spiky Pig or Porcupine knew there was nothing he could do against the Bacon brothers. He knew that what he should do was nothing. He knew, of course he knew. Everyone in the forest army had their own role, and the letters before Spiky Pig or Porcupine's name were: t. m. What does it mean? Trick master, of course!

So, trick master Spiky Pig or Porcupine was hiding quietly under the Hawthorn, and as soon as the robbers were gone, he came out and hurried into the great forest. His road led to the darkest path of the forest.

Do you want to know where the forest army's trick master the Spiky Pig or Porcupine went?

To find his big friend the Blue Pig in the belly of the woods, of course. His legs were small, though, so no matter how much he wanted to help his friend, he was very slow. So, he rolled himself up into a ball and rolled into the woods, further and further and rolled and rolled until he reached the Blue Pig's house just two hours after midnight.

The Blue Pig awoke with a loud snort and was on his feet ready to fight, his long white tusks pointed like a sword (some people called him a Wild Boar behind his back). He was magnificent, but also scary, and he was covered in all shades of blue in the moonlight, light blue and dark blue, French blue and German blue, and who knows how many other kinds. The Spiky Pig or Porcupine looked up at his big friend and was sure the robbers would be afraid.

"Any friend of yours is a friend of mine!" – the Blue Pig replied when he heard what happened in the land of bearded oaks.

"Then let's get going right away!" – said the Spiky Pig or Porcupine, who was the master of tricks in the forest army, and also the master of doing when things had to be done.

They got going right away. The Spiky Pig or Porcupine climbed on top of his big friend's back and took a seat in his fluffy fur and they were ready to go, running through the woods, almost flying through the moonlit night, the Blue Pig's tusks glowing in the light.

Soon enough they were in the robbers' tracks, and soon after that they caught up to them on the Winding Path leading straight to the robbers' castle in the rock. The Bacon brothers didn't get far, not even with their flaming-tongued, six-legged dogs.

They were so surprised when out of the blue, the Blue Pig charged at them like a whirlwind. They flew in all directions and could barely do anything. Bacon I was the only one to aim his white-spotted three-barreled gun at the pigs, but the Spiky Pig or Porcupine rolled up behind him and poked Bacon I who was so startled that he shot three bullets in three different directions: one hit Bacon V, another one Bacon VII, and the third hit one of the flaming-tongued dogs. Loud screams could be heard while they were running away: the seven robbers and two dogs ran as fast as they could – how far they got no one knows to this day.

The three friends walked all the way back to the land of bearded oaks. It was morning by the time they got to the Green Pig's home. They were tired and hungry. The Green Pig invited them in, and the Blue Pig took off his fur coat and gave it to the Green Pig.

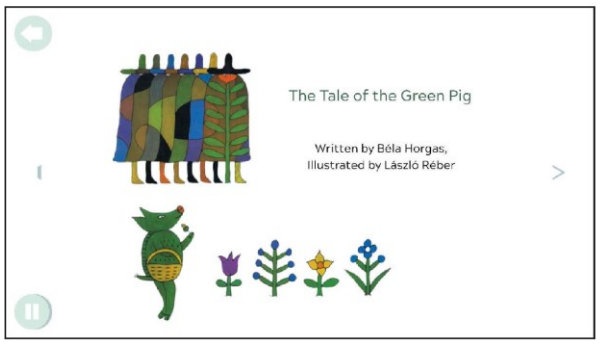
"Wear this coat and you'll be safe," – the Blue Pig said. – "Every robber will think that you're the Blue Pig and they won't even try to hurt you."

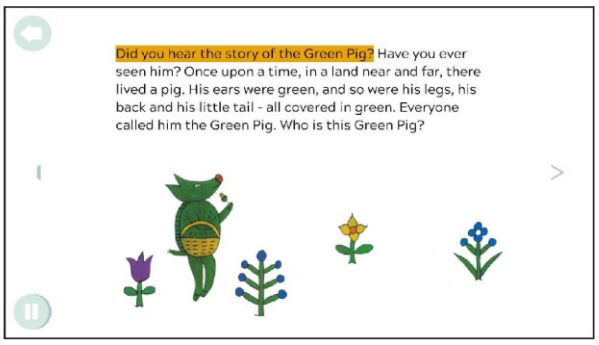
The Spiky Pig or Porcupine was amazed by his big friend. He knew he was strong and kind, but he never thought he could come up with a trick like that.

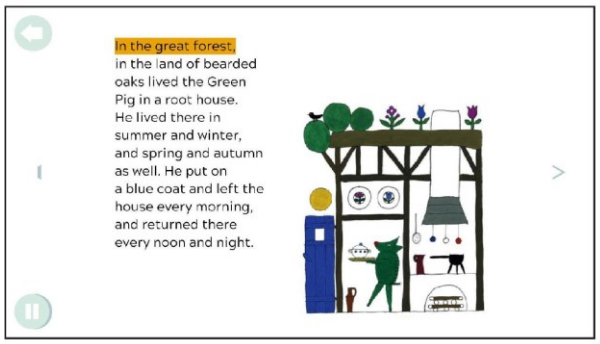
The Green Pig was very thankful and quickly put on her new clothes. Since then, no one has ever seen the Green Pig without her blue coat. She is safe! Of course, no robbers ever came to the land of bearded oaks again… But even if they did, the blue coat would protect the Green Pig. And not just because it would scare the robbers away. The blue coat and the memories they all shared would give the Green Pig strength and keep her safe. Hurray!

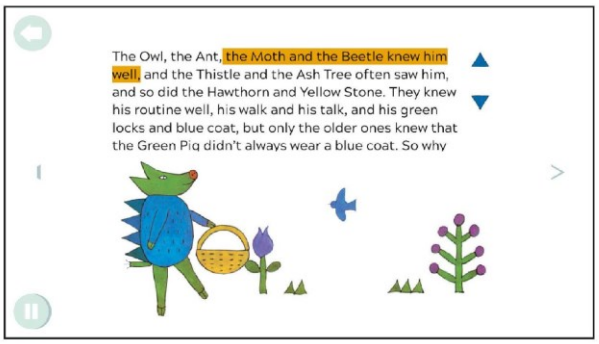
*Appendix 16*

**Illustrations for the interactive book *The Tale of the Green Pig* (by László Réber)**

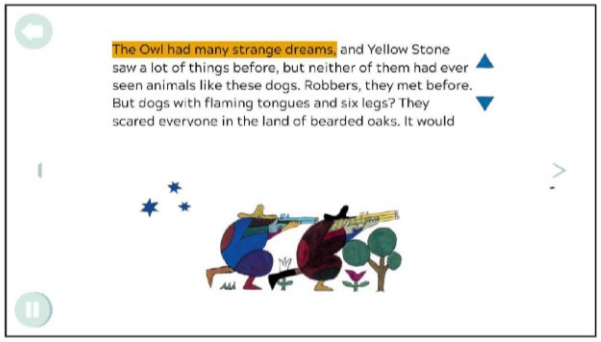


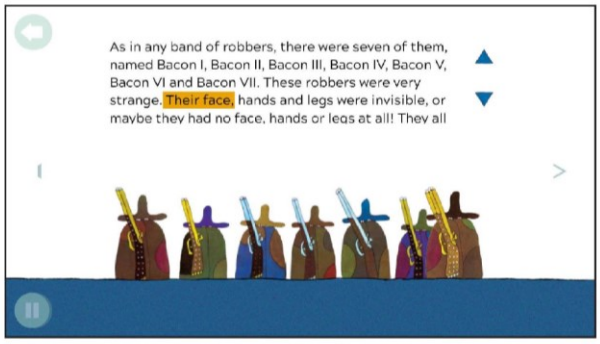



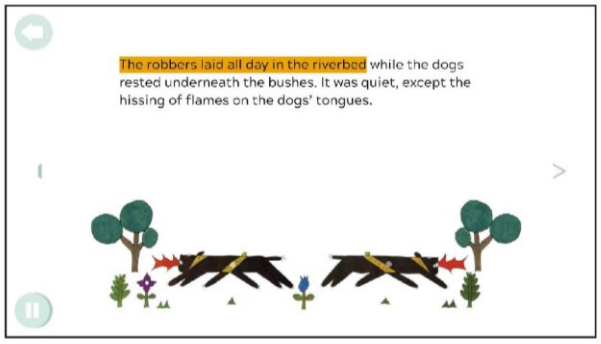



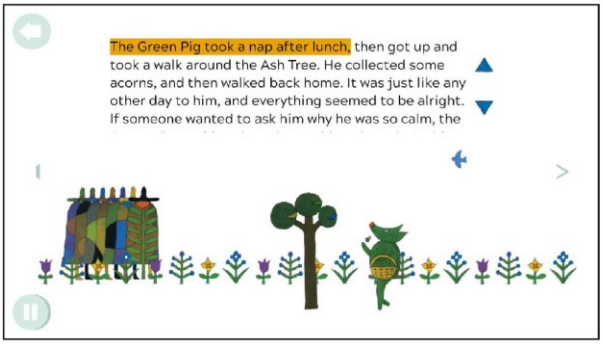





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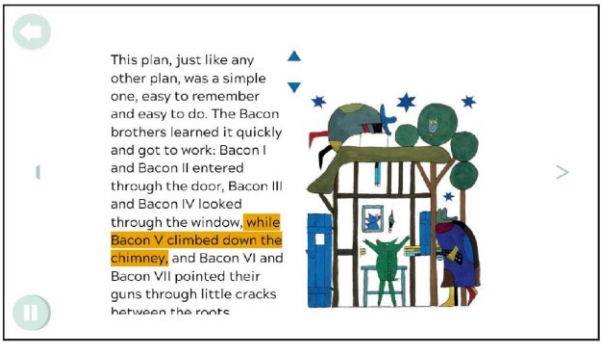
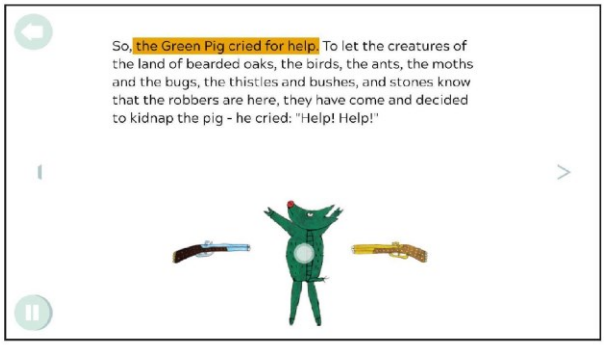
oaks. After dark, the robbers made a fire. It was easy! They collected three dry branches and some grass, then Bacon I whistled and his dog came running and licked the pile of wood, which caught on fire. Then, Bacon I whistled again and all the other Bacon brothers


This plan, just like any other plan, was a simple one, easy to remember and easy to do. The Bacon brothers learned it quickly and got to work: Bacon I and Bacon II entered through the door, Bacon III and Bacon IV looked through the window, while Bacon V climbed down the chimney, and Bacon VI and Bacon VII pointed their guns through little cracks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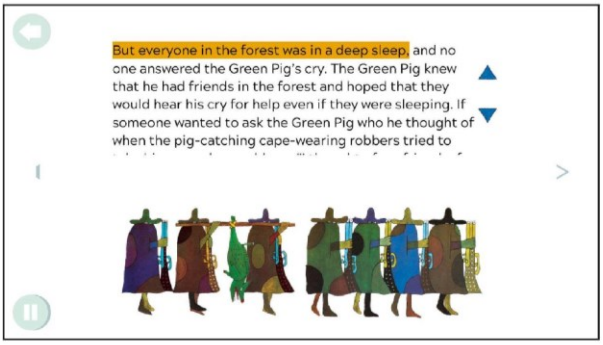
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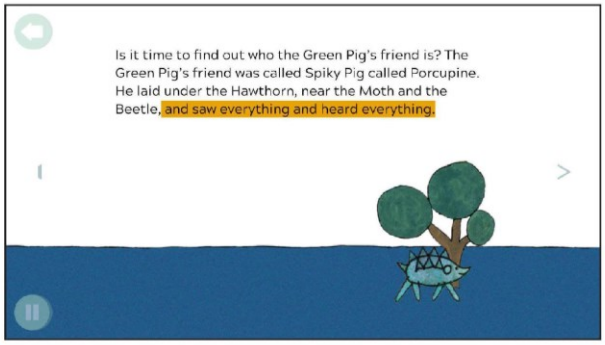
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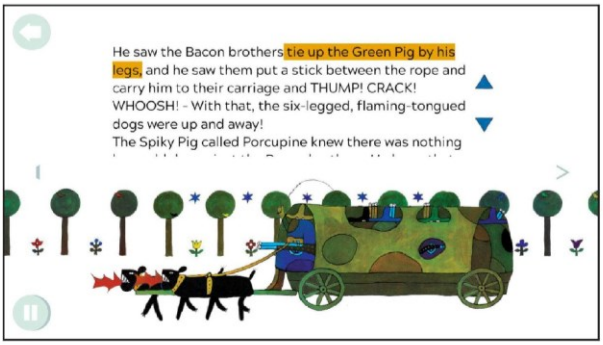
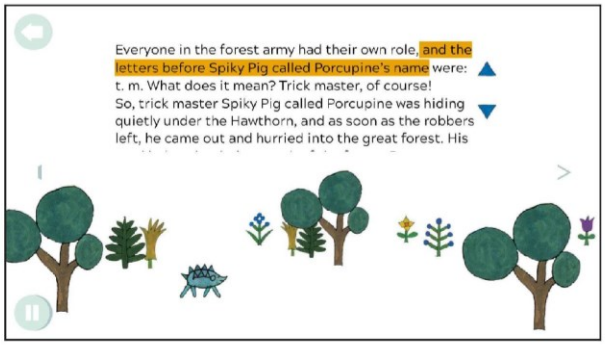

He saw the Bacon brothers tie up the Green Pig by his legs, and he saw them put a stick between the rope and carry him to their carriage and THUMP! CRACK! WHOOSH! - With that, the six-legged, flaming-tongued dogs were up and away!
The Spiky Pig called Porcupine knew there was nothing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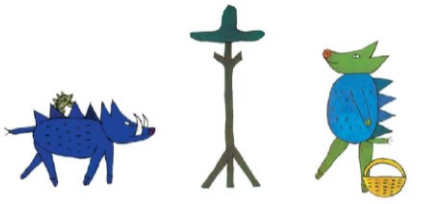
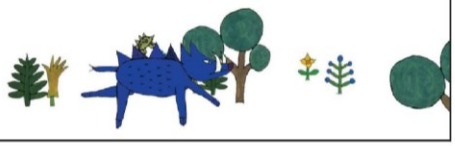
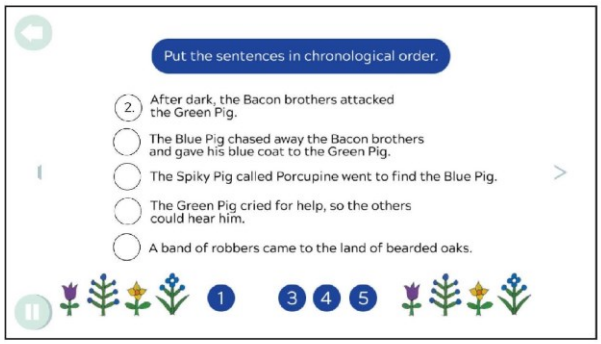
The three friends walked all the way back to the land of bearded oaks. It was morning by the time they got to the Green Pig's home. They were tired and hungry. The Green Pig invited them in, and the Blue Pig took off his fur coat and gave it to the Green Pig.

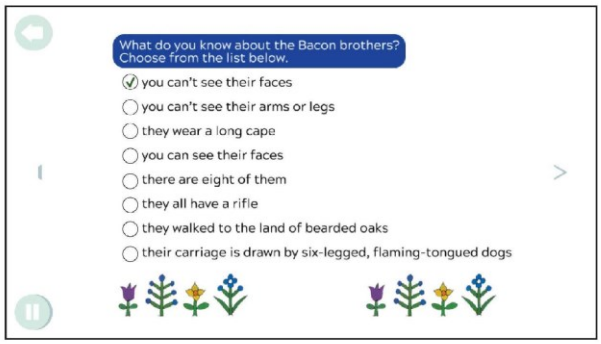
come up with a trick like that. The Green Pig was very thankful and quickly put on his new clothes. Since then, no one has ever seen the Green Pig without his blue coat. He is safe! Of course, no robbers ever came

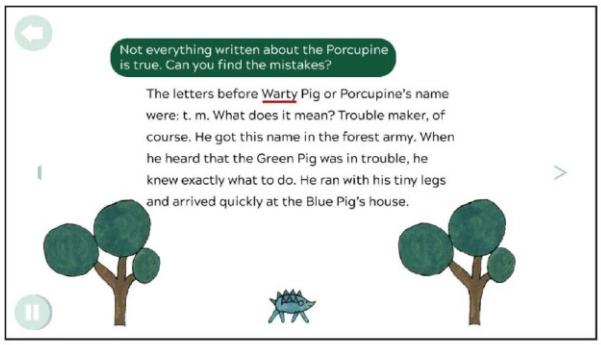


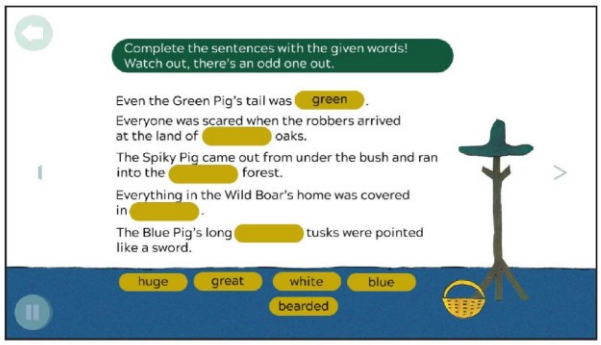
Turn the page for some games.




Put the sentences in chronological order.
2. After dark, the Bacon brothers attacked the Green Pig.
The Blue Pig chased away the Bacon brothers and gave his blue coat to the Green Pig.
The Spiky Pig called Porcupine went to find the Blue Pig.
The Green Pig cried for help, so the others could hear him.
A band of robbers came to the land of bearded oaks.
1
3 4 5


What do you know about the Bacon brothers? Choose from the list below.
you can't see their faces
you can't see their arms or legs
they wear a long cape
you can see their faces
there are eight of them
they all have a rifle
they walked to the land of bearded oaks
their carriage is drawn by six-legged, flaming-tongued dogs


Not everything written about the Porcupine is true. Can you find the mistakes?
The letters before Warty Pig or Porcupine's name were: t. m. What does it mean? Trouble maker, of course. He got this name in the forest army. When he heard that the Green Pig was in trouble, he knew exactly what to do. He ran with his tiny legs and arrived quickly at the Blue Pig's house.


Complete the sentences with the given words! Watch out, there's an odd one out.
Even the Green Pig's tail was green.
Everyone was scared when the robbers arrived at the land of oaks.
The Spiky Pig came out from under the bush and ran into the forest.
Everything in the Wild Boar's home was covered in .
The Blue Pig's long tusks were pointed like a sword.
huge
great
white
blue
bearded


THE END
BOOKR
KIDS

**János Arany**

***Family Circle***

The evening comes and everything is hushed,
while darkly nods the leafy mulberry tree;
a buzzing insect strikes against the wall,
a loud crash follows, there is heard no more.
As if the very clods of earth had legs
the clumsy frogs to rolling everywhere
while round the eves there wheels a wandering bat,
an old owl's hooting in a ruined tower.

Recently milked by the woman of the house
the white form of a cow is faintly seen
chewing the cud in silence in the yard:
a placid beast, though bothered by her calf.
A cat, to lazy to go chasing flies,
her body stretched, moves slow with cautious steps,
she pauses, looks around and is gone -
she's fled into the hall with sudden speed.

The door stands open; on the courtyard hedge
the hearth's reflected light is welcoming.
Before the door, his feet upon the steps,
a faithful dog lies stretched to guard the home.
Within, the woman of the house skims milk;
her small boy asks and has from her a sip.
She then goes mingling with the other ones
just like the gentle moon among the stars.

A young girl's throwing twigs upon the fire -
the eldest and most fair, a morning star;
she warms her iron for her new-made dress
- and ironing's all it needs - for next day's feast.
She tells a story to the younger ones,
sitting around at work, all shelling peas,
or shredding beans, their little chubby cheeks
lit by the fire, a flame with crackling pods.

The youngest asks for bread, then munches it
and weaves a circle with a burning brand.
The older boy ignores the rest and reads
(this lad will be a pastor, that is sure) -
such is at least his father's fondest wish,
although as yet he doesn't care for prayers
and much prefers to study songs and rhymes
he's even tried his hand at writing verse.

But now they hear their father's hoe put down,
his well-worn satchel's hung upon a nail.
The children search in it and hope to find
some bits of bread he left after the day.
They thrust their hands in; there's a sudden shriek -
"some devil's in there.... No, a little rabbit!"
cries of delight... They will not sleep all night
they go and fetch it cabbage leaves to eat.

The father says "Good Evening" to them all,
sits down to stretch his tired and aching limbs;
with dusty shirt-sleeve wipes a wearied brow
that has been deeply furrowed by life's cares.
But when he sees his little ones around,
delightfully his wrinkles disappear;
he knocks his soothing pipe upon the hearth
and smiles at kind words from his gentle wife.

The house-wife hurries then to fetch his food.
It's proper that he should not have to wait.
Soon she has pushed the small round table out
and brought the simple dishes she's prepared.
She and the children have already fed.
"Come dear," he says, they must all eat again,
the food tastes better if all feed together:
then gives the little ones a leg or wing.

"But who's that knocking? Sarah, go and see..."
A poor man's asking shelter for the night.
Don't turn him out if he has got no home;
how many suffer driven from shut doors.
The eldest girl gets up and asks him in,
a crippled soldier bids them a good evening:
"May God bless what you eat," he says to them,
"and those, too, who partake of it," he adds.

The father thanks him. "Come, and have your share;
mother, put on his plate a little more."
Then he invites him to sit down with them
the man says `no,' then readily agrees,
enjoys a simple but a tasty meal,
a jug of water then quenches his thirst.
No words are uttered while they have their food
this is the Magyars' custom when they eat.

But when the meal is done all do their best
to make it easy for their guest to speak.
At first his words come like a little stream,
but like a swelling river they soon flow.
The elder boy, too, lays his book aside;
he leans towards him with attentive eyes;

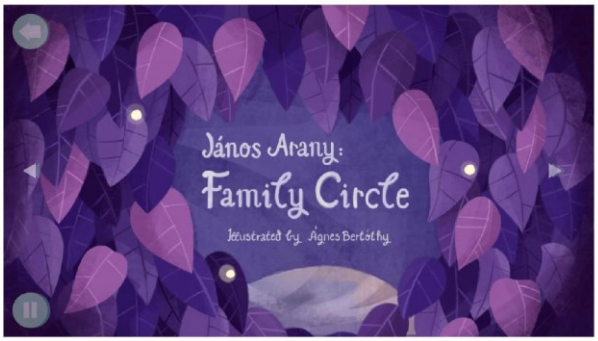
no sooner does the soldier come to pausing
the boy entreats him: "Tell another tale!"

"They are not `tales"' - the father chides the boy,
the soldier understands and carries on.
And they are hanging on his every word,
but it's the eldest girl who's most intent.
When no one's listening, or no one sees,
she asks about `her brother' with a blush:
for three years she's been asking after him,
she'll wait one more before she weds another.

The evening ends; the warm fire shines no more.
The glowing cinders now begin to wink.
The children, too, are tired, there's one asleep.
His head is resting on his mother's lap.
The guest speaks less, the silences increase;
only the purring of the cat is heard.
Then rustling straw is heaped upon the ground
the crickets reign now in this silent realm.

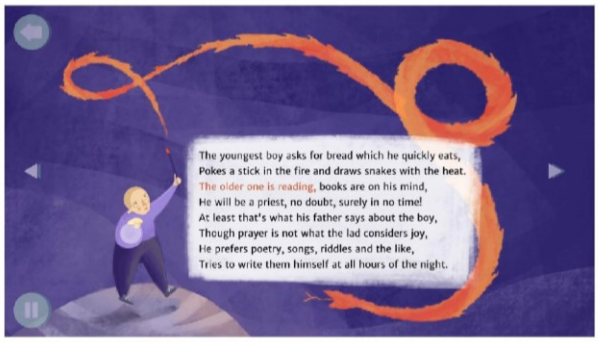
*Appendix 18*

**Illustrations for the interactive book *Family Circle* (by Ágnes Bertóthy)**







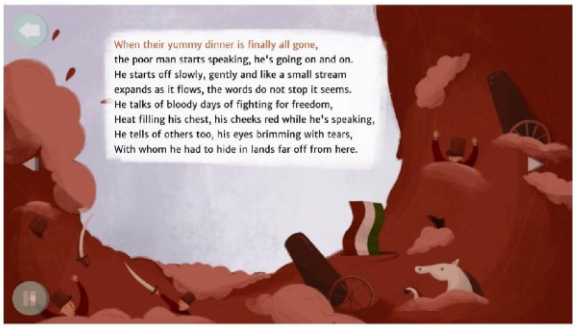





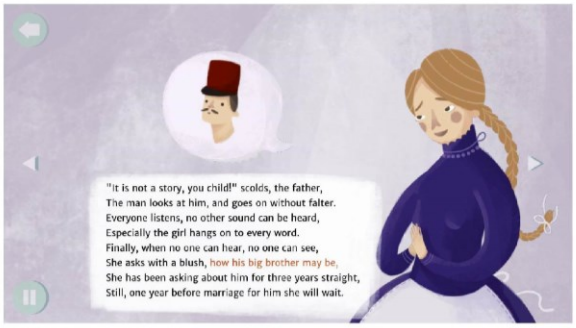

The good homemaker never makes her husband wait,
She prepares his food and sets it out on a plate,
She sets the table in the middle of the room,
Lays the simple food out, not a moment too soon.
She's already eaten, the children are all full,
But her husband ushers, "sit next to me, jewel!"
When eaten with family, the food tastes better
some wings or a chicken leg, they share together.

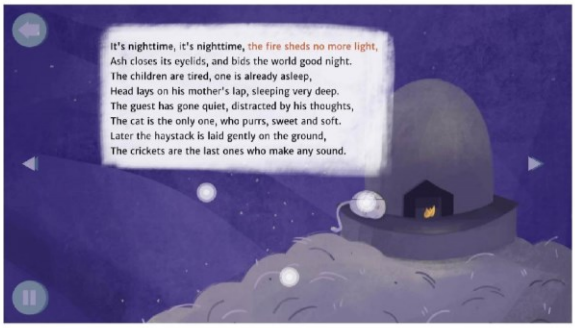

But who might be knocking? "Please check, my dear daughter!",
A poor man looking for a bed and some water.
Why wouldn't we let him in, if he has no home?
He must suffer so much, out there cold and alone.
Sarah steps back inside, the man not far behind,
A lame soldier walks in, his greeting very kind:
"May God bless your family's delightful supper,
(he finishes by saying) and you who offer."


The farmer thanks him kindly, says words in return:
"Fill the bowl again, my wife, let him have a turn!",
Then he tells the stranger, sit a little closer,
He hesitates a bit, then sits in the corner.
Their hunger is sated from the bountiful bowl,
And their thirst is quenched by a pitcher that is full,
Words are rare while they are sharing their humble meal,
That's the custom of the Hungarian people.

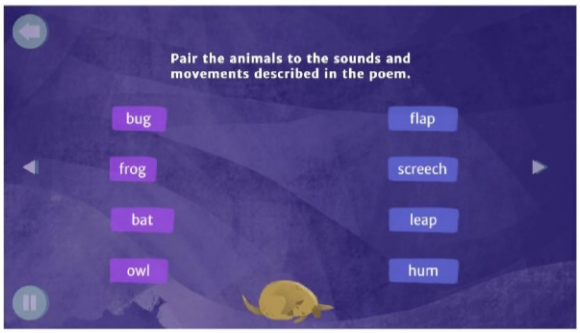

When their yummy dinner is finally all gone,
the poor man starts speaking, he's going on and on.
He starts off slowly, gently and like a small stream
expands as it flows, the words do not stop it seems.
He talks of bloody days of fighting for freedom,
Heat filling his chest, his cheeks red while he's speaking,
He tells of others too, his eyes brimming with tears,
With whom he had to hide in lands far off from here.

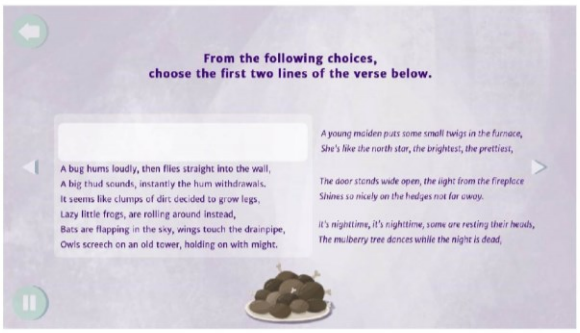

He talks of his desire, for the homeland he missed,
How long the journey was, and how hard to persist.
At last, the older boy goes to put his book down,
Intrigued by the man, he listens to every sound,
And when the stranger finally stops for a breath,
"Another story, please!" The young man nearly begs.


"It is not a story, you child!" scolds, the father,
The man looks at him, and goes on without falter.
Everyone listens, no other sound can be heard,
Especially the girl hangs on to every word.
Finally, when no one can hear, no one can see,
She asks with a blush, how his big brother may be,
She has been asking about him for three years straight,
Still, one year before marriage for him she will wait.

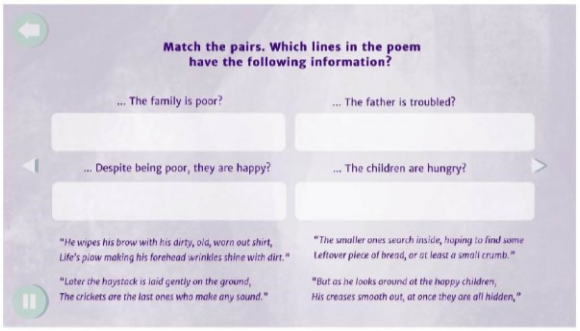

It's nighttime, it's nighttime, the fire sheds no more light,
Ash closes its eyelids, and bids the world good night.
The children are tired, one is already asleep,
Head lays on his mother's lap, sleeping very deep.
The guest has gone quiet, distracted by his thoughts,
The cat is the only one, who purrs, sweet and soft.
Later the haystack is laid gently on the ground,
The crickets are the last ones who make any sound.

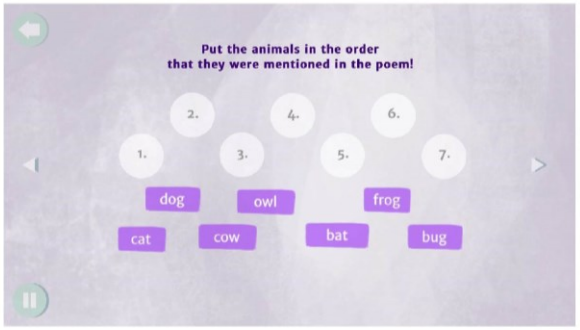

Turn the page for some games.


Pair the animals to the sounds and movements described in the poem.
bug
frog
bat
owl
flap
screech
leap
hum


From the following choices, choose the first two lines of the verse below.
A bug hums loudly, then flies straight into the wall,
A big thud sounds, instantly the hum withdrawals.
It seems like clumps of dirt decided to grow legs,
Lazy little frogs, are rolling around instead,
Bats are flapping in the sky, wings touch the drainpipe,
Owls screech on an old tower, holding on with might.
A young maiden puts some small twigs in the furnace,
She's like the north star, the brightest, the prettiest,
The door stands wide open, the light from the fireplace
Shines so nicely on the hedges not far away.
It's nighttime, it's nighttime, some are resting their heads,
The mulberry tree dances while the night is dead,


Count how many syllables are in one line of the poem. Choose the correct answer!
It's nighttime, it's nighttime, some are resting their heads,
The mulberry tree dances while the night is dead,
A bug hums loudly, then flies straight into the wall,
A big thud sounds, instantly the hum withdrawals.
It seems like clumps of dirt decided to grow legs,
Lazy little frogs, are rolling around instead,
Bats are flapping in the sky, wings touch the drainpipe,
Owls screech on an old tower, holding on with might.
8
10
12


Match the pairs. Which lines in the poem have the following information?
... The family is poor?
... The father is troubled?
... Despite being poor, they are happy?
... The children are hungry?
"He wipes his brow with his dirty, old, worn out shirt,
Life's plow making his forehead wrinkles shine with dirt."
"Later the haystack is laid gently on the ground,
The crickets are the last ones who make any sound."
"The smaller ones search inside, hoping to find some
Leftover piece of bread, or at least a small crumb."
"But as he looks around at the happy children,
His creases smooth out, at once they are all hidden,"


Put the animals in the order that they were mentioned in the poem!
1.
2.
3.
4.
5.
6.
7.
dog
cat
owl
cow
bat
frog
bug


BOOKR
KIDS
The End

*Appendix 19*

**Sample lesson plan**

*Who Ate the Raspberries?*

**Class**: 2

**Teaching material:** *Who Ate the Raspberries?* by Ágnes Nemes Nagy
The interactive book app is available in the BOOKR School applications, reading length: 3 minutes.

**Type of lesson:** a lesson of presenting new content

**Development focus:**

- developing reading comprehension skills
- getting familiar with the devices of lyrical texts: rhyme, rhythm

**Dominant didactic tasks:**

- motivation
- presenting, applying new knowledge

**Method:** control group

**Tool:** printed text; digital text on tablet

**Learning objectives:**

- Awaken and increase a desire to read
- Develop reading comprehension and narrative skills
    - by identifying textual information: the key topic elements: *who, where, when, what*
    - by observing and interpreting simple place and time relationships
    - by identifying the time and place of the story
    - indicating the start and end point of the plot
    - by determining the order of events.
- Make meaning recognition more stable through animations and interactions for the group using the tablet.
- Develop students' interpretive activity and lay the foundations for the competence of reading digital texts while using the object (printed – digital application), by applying the (user) functions appropriately.
- Develop synergistic thinking and reading comprehension skills by recognizing and decoding relationships between various media.
- Develop the linguistic and cognitive ability to segment and connect language units (words, sentences, smaller text units); the ability to separate and connect visual and audio elements
- Enable students using the tablet to orient themselves simultaneously in a more complex space than the structure of the printed text in order to create "in-depth, meaning-making reading".
- Enable them to recall and express their experiences related to complex media effects (e.g., enjoyment, preference, curiosity and bad experience).

- Mobilize their aesthetic sense through aesthetic experience. Classroom Desk Arrangement

| **The course of the lesson** [92] **(activities and instructions)** | **The method used** | **Tool**[93] | **Form of teaching and teacher's role**[94] | **Development focus** |
|---|---|---|---|---|
| **II. The Introduction stage of the lesson**<br>**I.1. Classroom Desk Arrangement**<br>Arrange the tables in the room so that 4 children can sit at it at the same time. Ensure that students can move around.<br>Required equipment:<br>▪ For those using a printed book: textbook, exercise-book, pen holder<br>▪ For those using the tablet: tablet | coordination | classroom equipment:<br>▪ course book<br>▪ exercise book<br>▪ tablet<br>(It is advisable to place the worksheets on the students' desk at the beginning of the lesson, upside down.) | coordinator | |
| **I.2. Group formation**<br>"Find its match." We cut a picture into 2-4 parts (according to the size of the group). We cut as many pictures as many groups we want to have. The parts of the pictures having been handed out, everyone tries to find parts of the same shape. Thus, the students who have the parts of a raspberry of the same shape will form a group. The topic of the pictures refers to the text to be analysed.<br>Question: While you are trying to find your groupmates, observe the parts carefully and find out the picture of what thing is given by the parts? | | A large picture (several copies) of a raspberry. | coordinator | ▪ developing visual attention<br>▪ developing visual logic and content logic skills<br>▪ recognising formal qualities, developing abstraction skills |
| **I.3. Assignment of tasks** | | | | |

[92] Steps specifically taken in the lesson (teachers and students)
[93] Tools required for the activity
[94] The concepts of cooperative learning organization appear in this, as well as the roles of teacher (task descriptor, instructor, coordinator and summariser, etc.)

| | | | | |
|---|---|---|---|---|
| Each student draws one of the envelopes on the desks, which includes the roles within the group: time keeper; note taker; devil's advocate – students rotate roles during the lesson. | | | | |
| **I.4. Pronunciation practice**<br><br>The text is repeated 2-3 times with different dynamics.<br>*"The itsy bitsy spider crawled up the water spout.*<br>*Down came the rain, and washed the spider out.*<br>*Out came the sun, and dried up all the rain,*<br>*and the itsy bitsy spider went up the spout again"* | | | | ▪ development of speech and articulation skills<br>▪ clear sound production |
| **I.5. Content Preparation - Fantasy Game**<br><br>Task:<br>"Find the fruits of the forest."<br>The teacher has hidden some fruit bowls at various points in the classroom. The task of the groups is to find them in the classroom following the description on the desks (time available: 3 minutes). The devil's advocate reads it out to his/her groupmates and the time keeper monitors the time.<br>You went on a trip in the forest, got hungry and searched for some forest fruits. Follow the description and find the fragrant, **succulent**, juicy, pleasant and delicious fruits.<br>Once you have found the fruits, offer some to each other and then to the members of the other groups as well.<br>After tasting the fruits of the other groups as well, go back to your seats and classify the fruits you tasted according to which one you found to be the most pleasant, the most **succulent** of them all. | | fragrant fruits (e.g. bananas, tangerines, oranges, apples) | coordinator | Developing spatial awareness, spatial perception, and thereby developing relational vocabulary (e.g. **under** a table; look to the right, left; lift it **up**; look **around** the clearing; at the foot of the wall, **at** the wall; reach up; **from** the shelf, line **up**)<br><br>Unknown word: giving its meaning (**succulent**).<br><br>Expanding the active vocabulary and clarifying by interpreting words in context. |
| **I.6. Content preparation – Animals of the forest**<br><br>Group role, rotation right or left: you'll get 4 minutes to perform the task, the timekeeper ensures that you stay on the task and complete the task on time.<br>Task:<br>Find out what kind of food animals in the forest eat. Use the pictures on your desk. Match the name of the food in the envelope to the picture of the animal living in the forest. In a full sentence, tell me which animal eats what. Be careful, there is an odd word out lurking among the foods.<br>Let the **grass snake** be the odd word out, so there will be an opportunity to discuss the meaning of the – presumably – unfamiliar word. In the other envelope you will find the homes of animals. Find the | | pictures of objects<br>You can work with animal images sent by BOOKR Kids. The names of the animals' feed must be written on small pieces of paper (as many times as the number of the groups) and there must be one more feed than the number of animals. The additional one is the name | group work; teacher: presenting tasks | ▪ reviving prior knowledge about animals<br>▪ developing wording skills<br>▪ thinking skills: relationship between species and sex |

| | | | | |
|---|---|---|---|---|
| place where a certain animal likes to hide when it wants to be safe or eat or have a rest. Be careful, there could be an odd word out here again. Here the hedgehog is the odd word out. You could talk about these animals by answering these questions: what do they eat, where do they live?<br>Give your answer in a full sentence. (The hedgehog lives under a hedge.) rabbit – burrow; fox – fox hole, at the foot of a tree – hedgehog; squirrel – tree; bear – cave; frog – lake; tit – nest; desk drawer> (an additional picture of a desk drawer) | | of the grass snake.<br><br>Envelopes (3 per desk) | teacher's role: instructor, task presenter; frontal work | ▪ developing thinking skills by recognising the relationship between species and sex |
| **II. Meaning-making**<br><br>**II.1. Objective**<br><br>Today we will get familiar with a story in which the most important event is a delicious snack.<br>The author of the poem: Ágnes Nemes Nagy, the title of the poem: *Who Ate the Raspberries?* | | | teacher's role: instructor, presenting task; frontal work | ▪ practicing and developing reading comprehension, the framework of which is text analysis (in lower grades of primary school)<br><br>▪ the goal of identifying the genre: to enrich and deepen students' literary knowledge e.g. author, writer, reader. |
| **II.2. Preliminary title examination – title mediation with the "brainstorming" technique**<br><br>Discuss and try to figure out what the story is about, where and when the plot can take place and who might be the characters?<br><br>**Brainstorming**<br>Write down what the ideas you have come up with have in common in 2-3 words on the sheet of paper on the desk. On another sheet, mark with one word those ideas that had nothing in common.<br><br>Discussing the ideas of the groups, putting the ideas of the groups on the board during the discussion. | making predictions | 2-2 sheets of paper or one larger piece of wrapping paper per group is needed | group work<br>teacher: presenting task | Everyone's contribution is valuable and unique: everyone can make comments, not just those who perform well.<br><br>Goal: to collect ideas within the group. The title is free to associate. The method develops the ability to associate and expands knowledge. |
| **II.3. Getting familiar with the text**<br><br>Sit comfortably, I will read the poem aloud to you. I wonder who likes what in the poem, or what you don't like.<br>**Teacher reading aloud** | | frontal | | |

| | | | | |
|---|---|---|---|---|
| Listening to children's spontaneous reactions with helpful questions: what did you like/dislike about the forest adventure story? | | | | |
| **II.4. Examining the verse form**<br><br>How do we know this text is a poem? (rhyme, rhythm) Try to find lines that rhyme with each other in the text.<br>Read it.<br><br>Count how many lines rhyme with each other. (2 lines)<br><br>Take the text, and those who are using the tablet the tablet.<br><br>Groups should be formed in such a way that there will be students in each group who read the printed text and the interactive book. Make sure that the children working on paper and tablets don't see each other's work. (Spatial separation, leaving a relatively large distance between students in each group is important.)<br><br>Today in class, we'll meet the text in two different forms. One half of the class will get to know the story in printed form and the other half in an interactive storybook.<br><br>Distribution of texts and tablets.<br><br>Take the printed text, and the other half of the class, start the app. Use the headphone and don't forget what interactions you've learned in the Sample book. Use and try out these interactions whenever possible.<br>Take out the worksheet and perform **Task 1, 2 and 3.** | discussion (questions and answers) | worksheets<br><br>▪ printed text<br>▪ tablet<br>▪ headphone | frontal work<br>teacher's role: presenting task | help students to recognise the peculiarities of poetic language (rhythm, rhyme). |
| **II.5. Analysing content and text structure by examining parts of text by location**<br><br>At the very beginning of the story, where does the plot take place? In how many verses can we read about the first location?<br><br>Who do we meet at this location? What are they doing, what are they up to? Who has given a surprise to his/her brother/sister like this?<br><br>Take the worksheet and perform **Tasks 4, 5, and 6.**<br><br>Checking answers.<br><br>What will be the next location? | | | | Expanding and clarifying the active vocabulary by interpreting it in context. Vocabulary expansion.<br><br>Why? > level of attaining critical reading.<br><br>Synthesis operation by developing visual interpretive skills, comparison and refinement of the internal image formed on the basis of textual meaning with the help of illustration |

| | | | | |
|---|---|---|---|---|
| Who are the characters in this location?<br><br>What are the bear-cubs doing first?<br><br>Try to find the verse in the text from which we learn that raspberries have a succulent, pleasant taste.<br><br>Helping Question: Who says in the text, *"How sweet, stuff it in your mouth?"*<br><br>Which line suggests that the bear-cubs were full after eating a lot of raspberries?<br><br>What movements do you use to express that you are full, turn to the others and show it to them.<br><br>Do you and your family members lie down after a delicious lunch?<br><br>What did the bear-cubs do after they had eaten the raspberries and felt full?<br><br>What does "*they are lying prostrate under the tree"* mean?<br><br>What happened after the bear-cubs had fallen asleep under the tree?<br><br>Thieves are often said to have **sticky** fingers because whatever they touch, they will take it with them as well.<br><br>What do the bear-cubs do when they are woken up from their slumber by the noise made by the thief?<br><br>Try to find in the text who they are going to visit first when they start looking for the basket. What do we learn about Paul Rabbit?<br><br>Then who else do they go to see one by one while looking for the basket? What do we learn about Mrs. Fox, Hedgehog Samuel and Squirrel Miklós? (What do they eat, where do they live?)<br><br>Take the worksheet and perform **Tasks 7, 8, 9, 11 and 12.**<br><br>(Tasks 11 and 12 are at the end of the interactive book.)<br><br>What makes us think that Squirrel Miklós wants to help the bear-cubs?<br><br>Did it turn out in the pine forest who stole the raspberries? How do we find out that the basket was stolen by Thief Ferke?<br><br>Now perform **Task 10** on the worksheet.<br><br>So what does it mean *"The pine forest won't* | | | | Synthesis operation by developing visual interpretive skills, comparison and refinement of the internal image formed on the basis of textual meaning with the help of illustration |

| | | | | |
|---|---|---|---|---|
| *hide the ones who have sticky fingers'*?<br><br>Perform **Task 19 and 20** on the worksheet.<br><br>Where did the bear-cubs get the raspberries that they filled the basket with? Read the line where you can find the answer.<br><br>At what location does the story continue then?<br><br>Who do we meet at this location?<br><br>Was the wish of the two bear-cubs fulfilled at the very end of the story? | | | | |
| Do you think they also ate some of the raspberries they took home? If you were Márika, would you offer some to your brothers/sisters too? | | | | We encourage children to form their own (moral) opinion. We work with them at the level of critical reading. |
| **II. 6. Synthesizing activities – by developing visual interpretive skills**<br><br>Perform **Task 13, 14, 15, 16 and 17** on the worksheet.<br><br>At the end of the lesson, perform **Task 18** and after you have completed it, sit up straight. Tell me in two or three sentences what this poem was about.<br><br>Homework<br>At home, choose the character or event you like best and draw them. You can use any tool or technique. | | | | Synthesis operation by developing visual interpretive skills, comparison and refinement of the internal image formed on the basis of textual meaning with the help of illustration |

*Appendix 20*

**Sample lesson plan**

*The Tale of the Green Pig*

Lesson 1

The fairy tale is analysed in 2x45 minute lessons due to its length. In the interactive book app, the story is analysed in lesson 2. The application can be found among BOOKR Suli fairy tales, reading length: 8 minutes.

**Teaching material:** types of tales

**Type of lesson:** Lesson of systematization and revision of knowledge

**Development focus:**

- Recalling and activating prior knowledge related to the fairy tale genre
  - types of fairy tales: animal tales, magic tales, cumulative/chain tales
  - the plot structure of fairy tales
  - fairy tale heroes
  - the language of fairy tales
- Recalling similarities and differences through various popular fairy tales stories

**Dominant didactic tasks:**

- motivation
- systematization and revision of knowledge

**Learning objectives:**

- Promote a love of reading in students, boost their reading motivation
- Develop their cognitive and operational skills memory, attention and logical thinking
- Improve their narrative skills by determining the time and place of the story, the start and end points of the plot, and the order of the plot elements.
- Lay the foundations for their literary literacy
- Promote aesthetic experiences in lessons of systematization and revision of texts in the fairy-tale genre.
- Lay the foundations for students' literary literacy and their emotional life and personality traits by this

**The course of lesson:**

**I. Introduction**

Activity: speech education, speech technology practices (word pyramid, sentence pyramid) The method used: experiential technique; form of work: frontal, teacher role: task description; objective of skills development: to develop language skills by activating passive vocabulary

**II. Main part**
**Activities/knowledge**

1. Reviving prior knowledge about the type of fairy tale with the help of tales students are familiar with: *The Raven and the Fox, The Cricket and the Ant, Árgyélus* and *Tündérszép Ilona*, etc.
Content aspects of systematization and revision: characteristics by origin; genre aspects; structural aspects; aspects of linguistic formation;

- the characteristics of tales according to their origin
  - folk tales: present the general; action-oriented; optimistic conclusion
  - artificial tales: emphasize the individual; reflect the author's values; more complex language compared to folk tales
- types of tales and groups of tales within folk tales
  - fairy tales
  - animal tales
- the most important features of fairy tales – as systemizing aspects of fairy tale revision:
  - presence of supernatural forces, miracles > part of the miracle is metamorphosis, which exemplifies the hero's extraordinary power
  - the ability of transformation needed to perform difficult tasks and change position, which increases the hero's extraordinary power
  - magical beings and magic tools; creatures and tools that help or harm
  - place, time
  - types of heroes; fairy tale names related to the character's personality
  - the structure of fairy tales: state of equilibrium – complication – complete hopelessness (climax) – resolution (the initial state of equilibrium is restored again, but already at a higher level)
  - fairy-tale twists, recurring fairy-tale motifs: the opposite of the beautiful and the ugly, the good and the evil; the motive of the three wishes; tension increase; generating tension by the reciprocity of certain events, but always at a higher level; large numbers> difficult trials; heroes – with unchanged character; good eventually will triumph*;* the hero sets out; the story of the fairy tale is the story
  - plot structure
- animal tales
  - simple animal tales: the heroes are bears, wolves, foxes, the most foolish of whom always loses out in the end.
  - tales about the relationship between different groups of animals are more complicated.
  - animal heroes talk, understand each other and sometimes even people. In these tales, animals live, think and act like humans. An important, defining element of animal tales is not the unconditional victory of the good, but trickery and wit, which commonly results in humour.
  - fables: are often credited to an author; their folk tales motifs: they represent the characteristic human relations of a given culture, which have not changed over the centuries; involve a succession of episodes, one particular moment determines the story's course
- formula fairy tales: the hero of the tale repeats his/her whole story from the beginning at each location throughout his/her journey

2. Determining the sequence of events and the person of the narrator. Recognising twists at the beginning and at the end of the tale, word relationships and recurring motifs typical of fairy tales.

**The method used**

During the lesson, the method of frontal teaching may alternate with cooperative learning techniques as needed and possible. The didactic method used also determines the form of work and the role of teacher.

**Form of work, teacher's role**

Coordinating and presenting the task.

**Tasks for skills development to achieve the goals indicated above**

The development goals indicated at the beginning of the project can be achieved by fulfilling tasks related to various sub-skills.

These sub-skills are as follows:

- Reviving genre knowledge related to fairy tales by students' naming the author and characters of the texts they have read; by explaining the characteristics and actions of the characters, **students' memory, logical thinking** and the operational skills that operate them (analysis, synthesis, comparison, observation) develop.
- Students' learning ability develops due to the incomplete sketches, tables, cluster diagrams, etc. built into the course of the lesson, which help to process knowledge through the use of cooperative techniques.
- Students' **reading comprehension skills** develop, and thus also their **ability to produce texts** by recognizing the twists, word relationships and characteristics of fairy tales; by telling the story of simple structured tales and narratives in chronological order in several coherent sentences

**III. Closing**

- Summary
- Homework: if possible, in its content it should be related to students' own experiences of fairy tales recalled in the lesson
- Assessment of the lesson: assessment of students' whole class work by the teacher and students, and providing some literary or visual experience for students who performed well in the lesson.

*Appendix 21*

**Sample lesson plan**

*The Tale of the Green Pig*

Lesson 2

**Teaching material:** *The Tale of the Green Pig* by Béla Horgas

**Type of lesson:** a lesson presenting new content

**Focus on development:**

- developing reading comprehension skills
- exploring the relationship between its pictorial and textual elements
- developing digital competence

**Dominant didactic tasks:**

- motivation
- presenting new content

**Method:** using a control group

**Teaching aids:** printed text; digital text on tablet

**Learning objectives:**

- Expand students' knowledge of literature, to enable them to incorporate the previously acquired knowledge of literature into new (poetic) relationship systems:
  - enable students to separate works of the Hungarian folk poetry and artificial poetry
  - enable students to recognize the genre characteristics of fairy tales
- Develop students' reading comprehension skills:
  - enable students to selectively read information to highlight information from the text
  - enable students to name the topic, characters and the main events of the fairy tale
  - enable students to judge the actions of the characters, to observe their characteristics
  - enable students TO recognize the relationship between image and content
- Recognize the goal-orientation of the animation and the relationships between text and image according to the medium's own abilities and be able to interpret this according to the relations.

| The course of the lesson (activities and instructions) | The method used | Form of teaching and teacher's role | Teaching aids | Development focus |
|---|---|---|---|---|
| **I. The Introduction stage of the lesson** | | | | |
| **I. 1. Tuning-in**<br>Look at the pictures on the board. What comes to your mind about the pictures? Which characters do you recognize? What type of story comes to mind about the pictures? (tale)<br><br>How did we classify tales in the last lesson according to their origin? (folk tales and artificial tales) What do we know about the origin of fairy tales? (Do we know the author or writer?)<br>What do we know about the origin of folk tales? How do we classify tales according to their characters? (animal tales, artificial, reworked tales) Mention some animal tales and fairy tales that you know. | questions and answers<br>talking | presenting the task | The pictures of the heroes of animal and fairy tales analysed previously appear on the board, including the figures of the *The Tale of the Green Pig* fairy tale.<br>It is important that animal characters and human characters from magic tales appear (The pictures sent by BOOKR Kids can be printed or projected.) (It is advisable to place the worksheets on the students' desk, upside down at the beginning of the lesson.) | systematization, repetition; brushing up on the story; students should name the characters and tales they were in |
| **I. 2. Objectives** | | | | |
| Today we will get familiar with a new tale that combines the features of animal tales and magic tales. | teacher talk | frontal | | Motivating and engaging students in text discussion. |
| The author of our tale today is Béla Horgas.<br><br>A brief introduction of the writer (Hungarian poet, writer, editor (explanation required), publicist (the word is probably to be interpreted); he was born in 1937 and died in 2018.)<br><br>Calculate how many years he lived? | teacher talk | presenting knowledge | The teacher puts / writes the name of the author on the board. | Consolidation of their knowledge about literature. |
| The title of our tale today is: *I Will Tell a Story about the Green Pig*.<br><br>What do you think? Is this tale an artificial tale or a folk tale? If we know its writer, which group can it belong to? | teacher talk | presenting knowledge | The teacher writes / sticks the title of the tale on the board. | Allowing students to make predictions and anticipate the text |

| | | | | |
|---|---|---|---|---|
| **II. Meaning making**<br>**II. 1. Preliminary title examination of the tale**<br>What does the title tell you? What do you think the text will be about? | | teacher: assigning tasks<br>frontal | | Allowing students to make predictions and anticipate the text. |
| **II. 2. Getting familiar with the text**<br>**I will read aloud the text to you.**<br>I want to know about your impressions after hearing the text. You can tell why you liked the tale if you liked it, but also if there was something in it that you didn't like. | teacher reading the text aloud | organiser | | |
| **II. 3. Analysing the text divided into parts.** | | | | |
| Get familiar with the text by reading it silently. You will also be given a task for individual reading. To do so, create **3 groups**.<br>The 3 groups are to be formed in such a way that each group will have students reading the printed text and then the interactive book. Make sure that children working on paper and tablets will not see each other's work. (Spatial separation, it is important to ensure adequate distance between students is important within each group.)<br>In our lesson today we will meet the text in two different forms. One half of the class will read the story in printed form and the other half in the interactive storybook.<br>Handing out texts and tablets.<br>One half of the class, take the printed text and look at it, the other half of the class, start the app.<br>Use the headphone and do not forget what interactions you got familiar with in the Sample book. Use these interactions whenever possible, try them out. | organiser | group work | ▪ tablet<br>▪ headphone<br>▪ printed text | Selective highlighting of essential information from the text. |
| **Group 1**, please divide the text according to the **locations.**<br>Those who use the tablets, please write the number of pages that belong to the same location into your exercise book. Those who use the printed text are to mark the paragraphs on the worksheet in pencil whose sequence of events takes place in the same location. Take a good look at the | | | ▪ printed text<br>▪ tablet<br>▪ headphone | Developing reading comprehension as well as narrative skills. Determining the linear sequence of events. |

| | | | | |
|---|---|---|---|---|
| locations, what do you know about the locations?<br><br>The task of **Group 2** is to pick out the **characters from the story.** (Those who use the printed text, please circle the characters on the printed page, and those who use the tablet, please write the names of the characters in your exercise book.) Notice what you know about these characters.<br><br>**Group 3**; please pick out **the elements of fairy tales**. (Those using the printed text, please circle the fairy tale elements on the printed page, and those using the tablet, please collect the elements of fairy tales in your exercise book.) | | | | |
| **II. 4. Checking**<br><br>What **locations** does the story take place in? The names of the locations will be put on the board according to the sequence of events. What do we get to know about these locations from the text? Read it out as well, please. (we should try to ensure that there is a reader from each group working with a different device)<br><br>Now those working with the **characters** are supposed to select the characters that we met in the tale on the board. Students are supposed to remove the picture of the characters from the board that are not in the tale.<br><br>Based on the pictures, they are also to name the characters.<br><br>Based on the pictures, they are supposed to introduce the characters, what we know about them, describe them with the help of the text. If possible, we should ask the children to give descriptions as close as possible to the text when checking understanding. They are also supposed to formulate which character they like best and why?<br><br>What are the parts of the text in which we hear the actual words of the Green Pig, the Spiny Pig, and the Blue Pig?<br><br>What marks the actual words of the Pigs in the text that we read?<br>(quotation marks)<br><br>Take the worksheet on the desk and complete Tasks **2–8**.<br><br>Think about everything that happened after we had met the Green Pig at the beginning of the story. You are a film director: how | | frontal<br><br>frontal | ▪ printed text<br>▪ tablet<br>▪ headphone<br><br>▪ printed text<br>▪ tablet<br>▪ headphone<br>▪ board with figures of the characters | |

| | | | | |
|---|---|---|---|---|
| many scenes would you break down what happened in the region of the Bearded Oaks into?<br>How long does the first scene last? Read the first and last sentences of the relevant part of the text. What happened at the location of the first scene?<br>Which detail is most exciting for those using the printed text? The ones using the tablets, please tell us what interactions in the app were related to the events? What did these interactions mark?<br>Who are the characters of the first, etc. part(s)? After checking and discussion, the pictures of the characters will be put to the appropriate locations on the board, in the order of the scenes.<br>Checking **the task of group 3**: they had to look for elements that we could never encounter in reality, that could not happen, or that do not exist at all.<br>Take out the worksheets and complete Tasks **9–13** and **18–22**.<br>The illustrations for the book were creared by László Réber. Look at the **illustrations**; you can see some on the worksheet. I wonder how skilful observers you are: you are expected to recognize the content links between the pictures and the text. Complete Tasks **14–15, 17.**<br>To complete Task **16**, please take the printed text again and start the app. | **a student who can read well read the relevant part of the text**<br>Due to the length of the text as well as the many tasks, students are to complete at least 3 of each task unit built into the lesson. | | | While discussing the text, the teacher should try to explore content and logical relationships by asking questions: Who did what? Where and why? |
| **III. Reflection**<br>Think about who you think the protagonist of this story was. Please write what comes to your mind first on the worksheet (see Task **23**), and then tell it to me aloud as well.<br>Homework<br>Make a drawing or description of the figure you consider to be the main character at home. | | | | |

*Appendix 22*

**Sample lesson plan**

*Family Circle*

**Class:** 6

**Topic:** family

**Teaching material:** The poem entitled *Family Circle* by János Arany
The interactive book app is available in the BOOKR Suli app.

**Type of lesson:** revision lesson

**Focus on development:**

- Developing language awareness by **activating passive vocabulary**; at certain stages of the lesson, we take advantage of the structure of the application that provides interaction opportunities.
- While performing the task, **students' skill to recognize logical relationships, draw conclusions and make comparisons** in the lexical field of the word 'family' develops.
- Students' **pre-viewing and simple summarisation reading strategy** becomes more effective.
- Students will be able to **observe and interpret simple place and time relationships** in medially rich texts through specific fairy tale apps: identify the time and place of the story; the start and end points of the plot and the order of the plot elements.
- Students' **literary competence** develops (genre, stylistic knowledge, verse form, author and title).
- **Their narrative competence** develops.
- Students will be able **to recall and express their experiences with complex media effects.**

**The course of the lesson**

**I. Tuning-in**

**Development focus:**

- While performing the task, **students' skills to recognize logical relationships, draw conclusions and make comparisons** in the lexical field of the word 'family' develop.

**The course of this stage of the lesson:**

- talking about the family (they can use experiential techniques)
- members of the students' family
- presentation of their family tree with a photo
- collating photos – what students think about who belongs to a family and they are expected to explain it why in full sentences? etc.

**Tasks to develop language awareness that can be built into this stage of the lesson:**

(Tasks 1-4 are optional!)

***Task 1:*** What is the difference between the two word forms: nagycsalád (a clan) – nagy család (a large family)?

***Task 2:*** Determine the family relationships according to the following criteria. Circle the letter of the correct answer

**The child of the old man's grandson is the old man's**

a) brother-in law

b) cousin

*c) great grandchild*

**The father of Lenke's cousin is**

Lenke's

a) aunt

b) uncle

*c) father*

**Grandma's husband is the grandchild's**

a) father

*b) grandfather*

c) uncle

**The wife of Pista's brother is Pista's**

a) uncle

b) cousin

*c) sister-in-law*

**The grandmother of the old man's great-grandson is the old man's**

a) grandson

*b) son*

c) daughter

**Luca's maternal uncle is Luca's mother's**

a) brother-in-law

*b) brother*

c) father

***Task 3*: Enter the answer**

My name:

My great-grandfather's child is my:

My great-grandmother's daughter, whose granddaughter my sister is, is my:

The children of my mother's sister or brother are my:

My mother's husband is my:

The brother or sister of my mother's husband is my mother's:

***Task 4***: Each of the words below (see *Figure 1*) is related to the family. Describe and interpret word combinations. Where the arrow indicating the logic of the word combination is missing, put it in yourself.

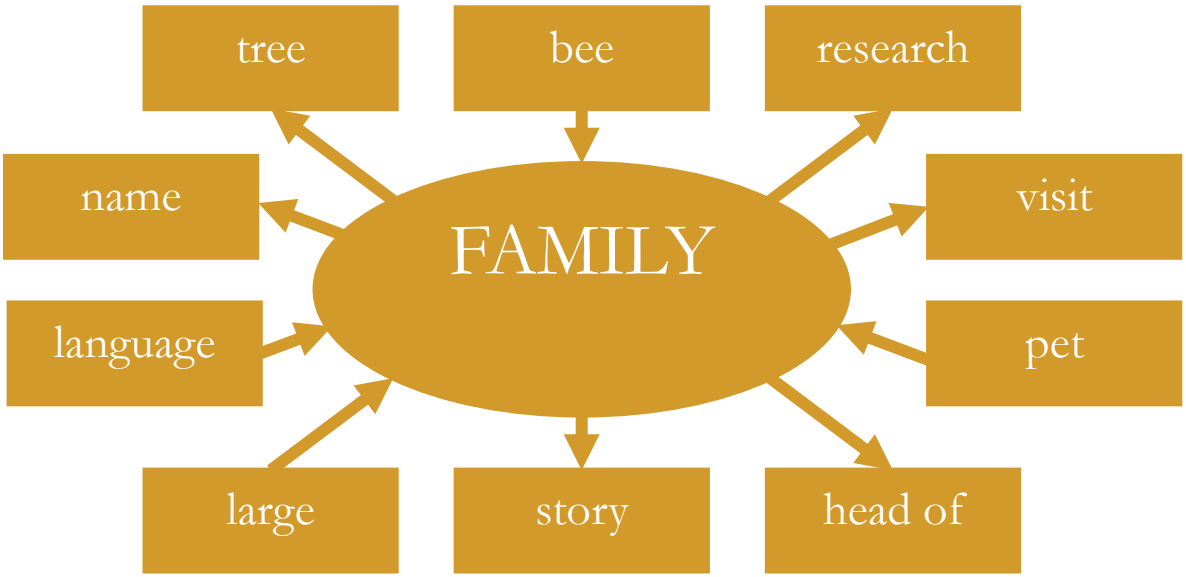



*Figure 1*

**II. Meaning-making**

**Development focus:**

- Students' **pre-viewing and simple summarisation reading strategy** becomes more effective.
- Students will be able to **observe and interpret simple place and time relationships** in medially rich texts through specific fairy tale apps: identify the time and place of the story; the start and end points of the plot and the order of the plot elements.
- Students' **literary competence** develops (genre, stylistic knowledge, verse form, author and title).
- **Their narrative competence** develops.

**The course of this stage of the lesson:**

Using headphones that can be connected to tablets, students listen to János Arany's poem *Family Circle* from the app. They should be reminded to use the interactions built into the *Family Circle* app as they learnt it in the Sample book app.

**1. Analysing the text**

***Instruction; aspects of observation***

- We got familiar with and learnt the poem last year (or during the term). We know that János Arany wrote the poem according to the tradition of idyll, a more than two thousand-year-old genre. The meaning of the word *idyll:*
  - little picture,
  - an extremely happy, peaceful, and picturesque situation or period of time, typically an idealised one
- Task – aspect of observation

Write on a piece of paper the number of the stanzas in which you encounter presentations of events and states triggering a mood that suits the genre.

- Discussion of solutions

***Revision questions to help students to comprehend text***[95]

Who are the "characters" in the poem? Who are the members of the family? (see *Figure 2*) Where does the story take place? How many episodes can the text be divided into? In addition to specific events, what inclusive events are referred to in the text? Where? How many places does the poet actually bring into the world of poem?

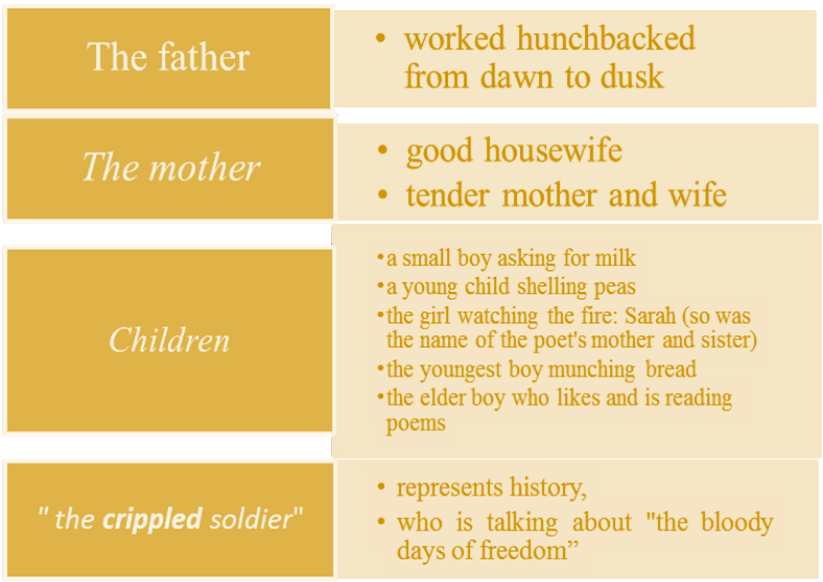



*Figure 2*

***Task:*** Take the worksheet and complete Tasks 1, 2, 3, and 4. (Task 4 should be completed on the tablet: "Sort in chronological order…")

**2. Analysing the linguistic and stylistic structure of the text**

***Folk-like, humorous and gloomy tone***

- While the poem present a *humorous* tone, it is also *gloomy* because of the glorious memory of the lost freedom:

  (…)
  But now they hear their father's hoe put down,
  his well-worn satchel's hung upon a nail.
  The children search in it and hope to find
  some bits of bread he left after the day.
  They thrust their hands in; there's a sudden shriek –
  "some devil's in there…. No, a little rabbit!"
  ↓
  ↑
  A crippled soldier enters and bids them a good evening (...)

- János Arany wrote to Petőfi about the folk-like tone, which also characterizes the poem, the following: "People's serious use of humour must be respected lest familiarity be taken as a

[95] The figures in the lesson plan were made based on the study by István Tóth. Tóth István, H.: Gondolatok Arany János: Családi kör c. életképéről. [Some Thoughts about the poem of everyfay life entitled *Family Circle* written by János Arany]- In:http://acta.bibl.u-szeged.hu/28123/1/modszertani_036_004_158-160.pdf (Accessed 24.01.2024.)

mockery and get annoyed". It also seeks to broaden the possibilities of folk-national poetry, and to include the non-naive and even modern realistic tasks and solutions of psychology and character drawing in its field of representation. Arany also conceives folklorism in the Shakespearean sense of the word…"

- The language János Arany uses makes us see and imagine things
  The poem is built upon visual and auditory experiences (see *Figure 3*). The perspective corresponds to the dimensions of the human world. The story is dominated by the objects and characters of the microcosm.

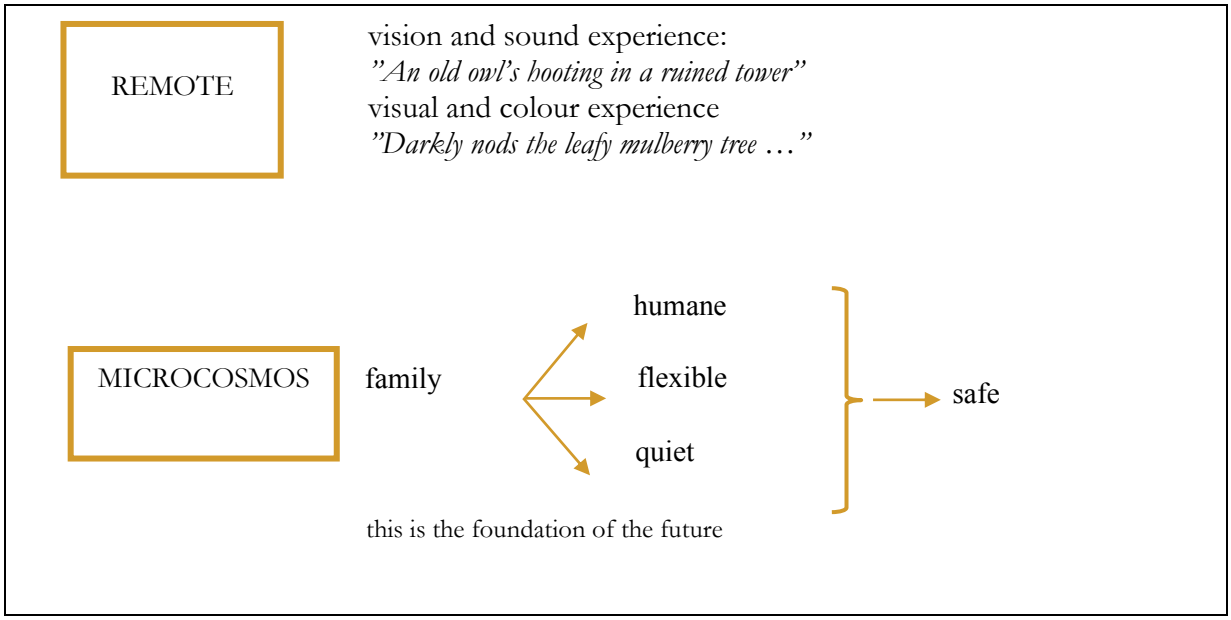



*Figure 3*

Complete Tasks 5, 6, 7, and 8 on the worksheet. (Tasks 5 and 8 should be completed on the tablet. Task 5: "Match the answers…"; Task 8: "Count…")

- Now we will be working with pictures as you have experienced, a story can be told not only in words but also in pictures. The illustrations of the *Family Circle* were created by Ágnes Bertóthy. Look at the illustrations for Tasks 9 and 10 again, and start the application again where necessary. (Don't forget to use the headphone!)

- Answer question 11 on the worksheet in the app ("Choose from the options…") then turn off the app and answer question 12 on the worksheet.

### 3. Examining the app interactions

Completing the following tasks will enable students **to recall and express their experiences with complex media effects.**

- You have become familiar with the types of interactions in the Sample book. Take the tablet again and find the relevant pages according to the tasks and complete Tasks 13, 14, 15 and 16. Finally, complete task 17 on the tablet ("Match animals with…").

### III. The reflection stage of the lesson

Recommendation: creating an exit card

- The most important thought from the poem for me was that …
- Questions that came to my mind while analysing the poem…

The book discusses the classroom implementation of an increasingly popular and critically acclaimed new online platform which has been included in several countries' public and higher education: interactive books. A 2019-2020 study conducted in Hungary, with a national scope, has shown that interactive books accessible on tablets and smartphones provide a revolutionary opportunity to develop the reading comprehension skills of younger generations, maintain their interest in literature and cultivate a culture and habit of digital reading in them.

„The authors have also carried out an extensive study during the research on which the book is based, the like of which has not been carried out in Hungary before. The authors' conclusions are therefore supported by empirical data and direct experience from a well-documented case study. (...) In the broader context of the research, the question is: how can school education be designed to provide children growing up in a digital environment with modern lessons, activities and experiences that are closely linked to everyday life, positively shape skills and abilities, and effectively transfer knowledge? What we read in this book is obviously only a small part of this – but a very important part." *Miklós Lehmann*

„The studies of reading with the help of interactive tools have increased in the last decade. Yet there is still a focus on the American experiences, even though from the early times there were distinctive differences in the perceptions of developers and critics of the continents, not only in terms of the market, the number of products, the education systems etc., but also in terms of knowledge about the subject and awareness of the ways of processing. Interactive book research is a specific field, where, I strongly believe, we need to know more, and in this particular case, as this book describes a 'capsule study', it is easy to understand the national characteristics, yet the conclusions are useful in many cultures. (...) This book is a well-defined case study that fully explores the possibilities of implementing an interactive reading tool. I find it an important material for mainly university professionals and students of this field, and it could be a useful read for teachers, and also for interactive tool/book developers and editors. The manuscript definitely adds to the research of reading studies." *Ildikó Wittmann*