http://jates.org

Journal of Applied Technical and Educational Sciences jATES

ISSN 2560-5429

jATES Journal of Applied Technical and Educational Sciences

Changing reading habits and methodological options resulting from digital transformation

Tünde Molnár Lengyel[a]

[a]*Associate professor, Eszterházy Károly College, Department of Informatics, 3300 Eger, Hungary, email: lengyelne.tunde@uni-eszterhazy.hu*

Abstract

The love of reading is an indispensable condition for the cultural development of nations. Children's habits when gaining information have changed, which has affected their relationship to reading, thus it is important to search for such solutions and supporting systems which enhance the popularisation of reading, and which support the interpretation of the content read. The paper presents such digital applications suitable for sharing the reading experience that can be used not only within the frames of formal classes, but in non-formal education as well. Libraries can motivate students with the applications, and by utilising the new possibilities, students will be more open to acquire knowledge and they will be more ambitious to experience reading. The article analyse which is the most innovative option: a share interface created with the intention of self-study, or the institutional initiatives to analyse a particular work of literature? Shall we encourage students to write blogs, or should they capture a particular moment of the work in a computerised graphic format? Will an analysis in a tag cloud shed light onto the most important elements, or should the experience be conveyed through moving pictures? The paper presents concrete feasibility options and analyse them based on their practical benefits.

Keywords: ICT innovation; ICT innovation in libraries; non-formal learning; popularising reading; reading experience; methodology

1. Introduction

The economic crisis of 2008 required a reconsideration of factors related to the functioning of society. The European Union considers the increasing of the capacity of human capital as one of the most important tools of dealing with the crisis. Consequently, the upcoming generations should be enabled to take advantage of the latest technologies via the creation of the necessary instructional and informal environment.

2. Digital literacy

Digital culture is gaining an increasing prevalence these days. Libraries have to be prepared to meet the needs of digitally literate readers while presenting special methodological approaches and options for librarians. The development of ICT devices impacts learning habits, making the respective qualification and preparation level of pedagogues and librarians crucially important.

2.1. Definition of digital natives

First we provide a list of conditions the current youth generation has to meet in order to be declared digital natives:

- an ability to use on-line information and communication technologies in a natural and problem free manner.
- proficiency in using search engines, search fields (Amazon, Google) providing fast gratification
- the belief in the importance of the incorporation of data bases in a virtual learning environment,(VLE) or in the actual working site
- favouring cooperation, teamwork, and social networks.
- non-linear, hypertextual thinking, reading is performed by mostly scanning via links
- multitasking as second nature (simultaneous performance of several tasks, living with a continuous yet partial attention or concentration span) (Godwin & Parker, 2008)
- a belief in the veracity of any information published on the web.
- working with micro contents (blog entries, posts, tweets) to convey thoughts.
- an ability to copy, paste and share desired content. (Racsko, 2012)

2.2. Digital literacy surveys

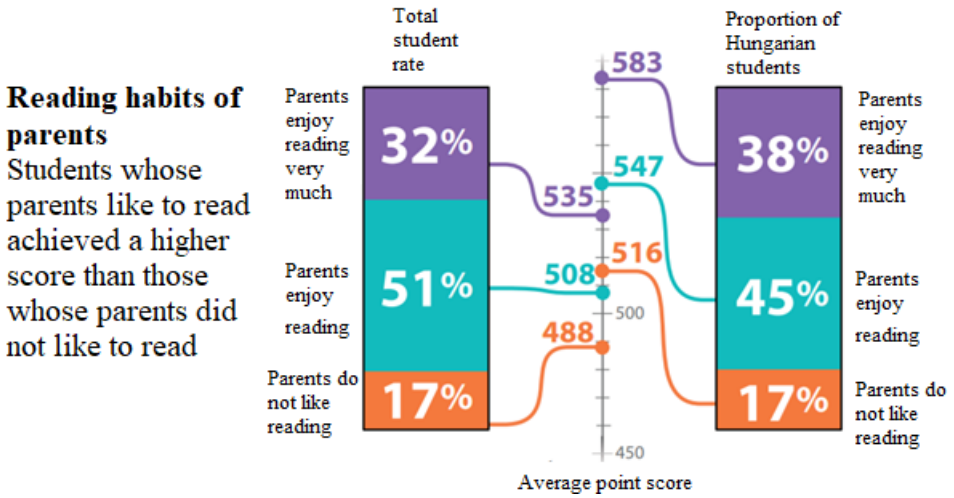
The respective study has a wide focus, which proves a partial explanation for the relative lack of results. In 2006 as part of the international PISA (Programme for International Student Assessment) survey in three countries digital assessment methods were introduced as an experiment. The first digitally tested aptitude and skill was in the area of natural sciences. However, by 2009 19 countries measured reading skills of on-line texts and in 2012 in addition to digital reading comprehension, the mathematical skills were assessed in a virtual form on a computer in 32 countries.

1. Figure Countries participating in the PISA survey(Balázsi, Ostorics, Szalay, Szepesi, & Vadász, 2013)

The results of the 2012 PISA survey suggest that students cannot acquire the adequate digital competences. However, the results widely vary according to countries as students from the Far East, from Anglo-Saxon countries and Estonia achieved above average scores, while in Italy, Germany, Portugal, and in Scandinavia average performance was registered. (Balázsi et al., 2013)

The performance of Hungarian students in the comprehension of digital texts was rather disappointing in 2015. As the respective tasks were placed at the final section of the test, 30% of Hungarian students did not even attempt to solve them. (STEKLÁCS, 2018)

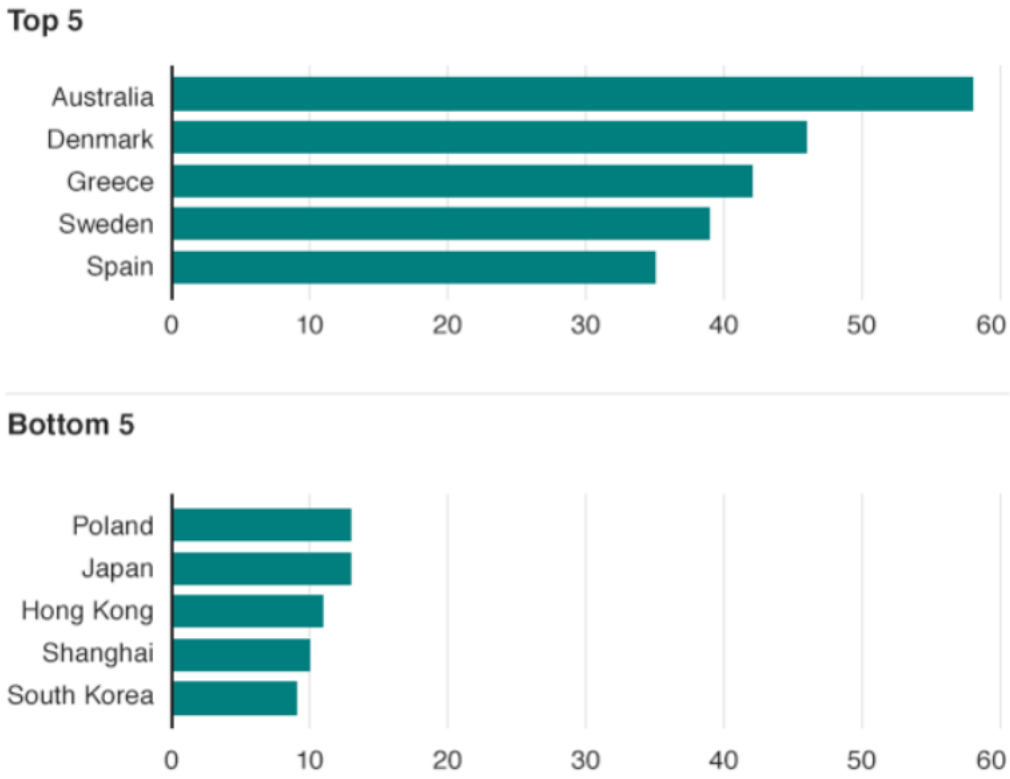
The situation is all the more distressing as Hungary in a PIRSL survey assessing the reading comprehension of fourth grade students was ranked 20th among 45 countries with a score of 39 points higher than the average score of 500 in 2011. Furthermore, in 2016 an even more significant improvement was achieved as Hungary was placed 13th among 50 countries with a score surpassing the average score of 500 with 54 points. ((A brief summary of the 2011, 2016 PIRLS and TIMSS surveys and the respective results, 2016.) Subsequent analyses suggested that "students whose parents liked to read could achieve better results than those whose parents did not prefer reading."(Info-graphics of a student background survey)



2. Figure Correlation between reading habits of students and their parents

Moreover, a 2018 survey assessing the digital competence of teachers identified information search and retrieval as the weakest competence of pedagogues. (ESZENYINÉ, 2018) The overall conclusion stated that pedagogues and the total public education sphere should be provided support in the fields of digital literacy, competence development and several related areas. for the implementation of curricular objectives. (ESZENYINÉ, 2018)

The elaboration of digital literacy does not require the substitution of textbooks for computers. It was concluded that those students had the highest performance in the PISA digital literacy testing, who used the computer frequently, but for a short time. An analysis published on the BBC website demonstrates that 8-12 minute computer use is sufficient to achieve outstanding results.



3. Figure Average daily minutes using internet at school (Coughlan)

The fact that those countries, where the Internet use is very intensive did not perform as well on the tests proves that Internet use by itself does not guarantee productivity. Consequently, the need emerges for the elaboration of methodological approaches usable during the specific classes and within informal learning contexts, in addition to their combination with traditional instruction as well.

It is an added difficulty that both teachers and librarians are required to develop the digital literacy of students, while their own skills need improvement as well. The Digital Agenda of the European Union assigns priority to digital literacy during its operational span lasting until 2020. Consequently, governments of member states are required to improve the digital skills as a means of promoting social and economic development. The info-communication strategy of Hungary aims at reducing digital illiteracy below 40% in the 2014-2020 period. This task should be fulfilled by cultural and community institutions. ”A crucial requirement for the development of the digital competences of people and small enterprises is the high level of digital familiarity of pedagogues and trainers participating in public and adult education along with the proficiency of public servants and administrators in the use of electronic public administration and other services. Consequently, the improvement of the digital competences

of these two groups is essential as well." (*Nemzeti infokommunikációs stratégia (National info-communication strategy) 2014-2020*)

Libraries also have to contribute to the formation of digital competences. One such method could be the establishment of a national network of training and consultation programs in larger cities both aimed at the business sphere and the general population regarding the electronic administration options.

Such new concepts appeared as e-Inclusion referring in a narrower sense to limiting the digital exclusion due to a lack of digital competence or Internet access. In a broader sense e-Inclusion aims at providing equal digital opportunities to the socially disadvantaged and disabled via the elimination of obstacles (*Nemzeti infokommunikációs stratégia (National info-communication strategy) 2014-2020*) related to physical mobility and spatial distance. The implementation of e-Inclusion plans will be among the new responsibilities of libraries.

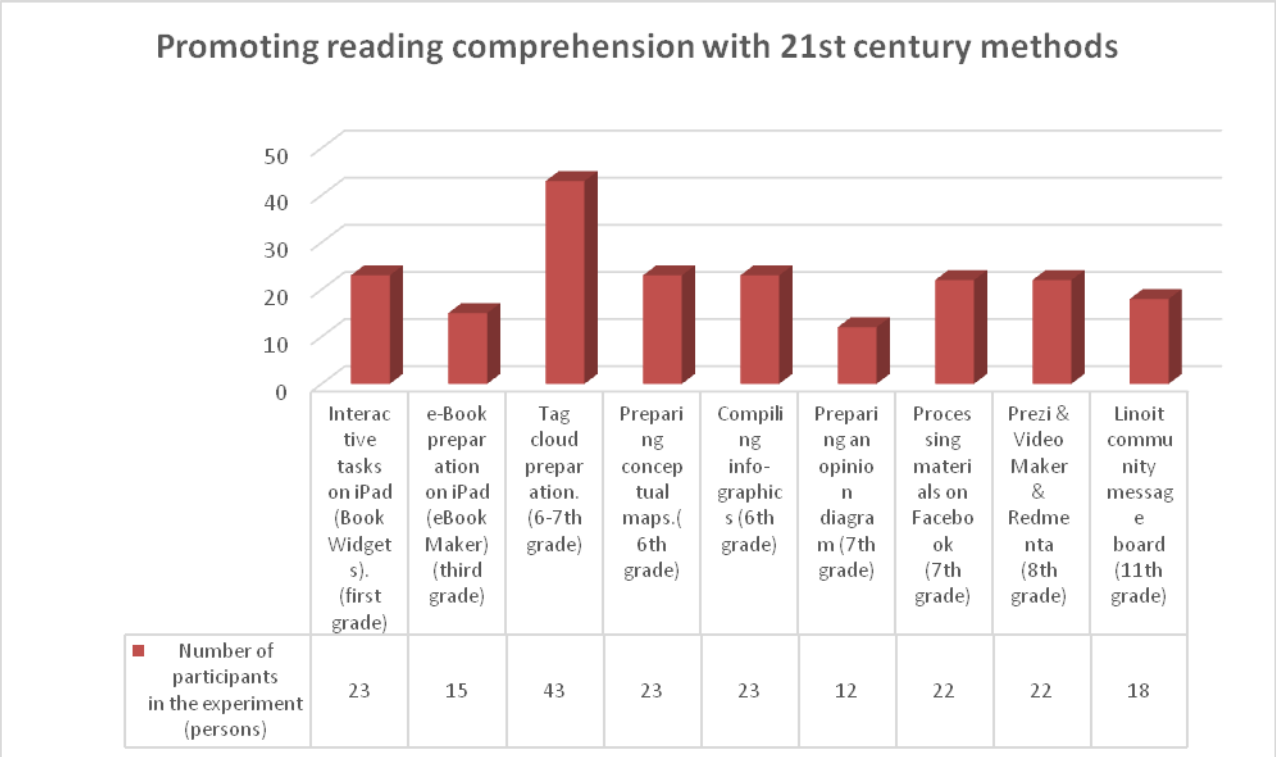
It is important to clarify that the concept of digital literacy does not exclusively refer to the use of info-communication devices. **Digital literacy can be defined as a conscious use of digital sources via a familiarity with info-communication devices, along with a communication and media production activity.** Thus the goal of any developmental effort has to surpass the mere use of devices and such solutions have to be elaborated whose application can increase the digital literacy of participants during the instruction and reading process unwittingly.

3. Methodological options

The love of reading is indispensable for the cultural development of nations. Since the modified information acquisition habits of students have an impact on their attitude to reading, it is important to find such solutions or support systems, which help the popularization of reading and the interpretation of the read material. If such methods are chosen which promote the discussion and analysis of the given text via ICT devices, students' digital literacy is developed at the same time.

The methods listed below were applied during the reading of various texts. Our experiment included 201 students. The members of the sample attending the lower elementary grades worked with folk or fairy tales, students in the upper section read texts related to Biology lessons, and fifth grade students focused on Géza Gárdonyi's novel, Eclipse of the Crescent

Moon.



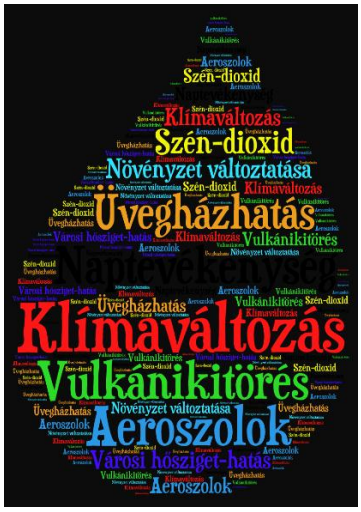
4. Figure Promoting reading comprehension with 21st century methods

In the next stage of the research process the respective methods were tested in a library environment and students focused on the data visualisation aspects of a youth novel (Laura Leiner's Joan of Arc High School).

According to the respective results the following approaches promised the highest potential:

3.1. Tag cloud

Tag clouds containing the crucial informative words and expressions of the given document are effective visual means of presentation. The size, thickness, and dominance of the given words refer to relevance and frequency of use in the respective texts.



5. Figure Tag clouds made with the application of Tagxedo.

Application options

- Visualization of the content of the text found on a web page, or of the expression of the frequency of words searched for by users
- In case of the alphabetical arrangement of key terms the relevance is expressed by the letter size (font) or colour
- Facilitating navigation on a webpage where tags are functioning as references to subpages.

The tag cloud can be ideal for the illustration of the most frequently occurring words in a given text and the expression of the frequency of certain expressions.

We distinguish three types of tag clouds: (Tarcsi, Abonyi-Tóth, & Horváth)

- Text cloud. A tag cloud made from the words of a given text, the size of the expressions or words is determined by the frequency of occurrence.
- Collocational cloud: This is a version of a tag cloud illustrating the verbal collocations of the whole text, the size expresses the connection with the desired key term.
- Data cloud: The size of the tag is determined not by the frequency of occurrence, as it indicates a given quantity or value, i.e. the description of stock values.

The most frequently used on-line or web-based tag cloud producing applications include the Wordle, TAGul, TagCrow, Tagxedo

Tag clouds can be used for the processing, discussion, or analysis of readings.

The simplest solution is copying the electronic text of the given reading material into the tag cloud generating application and following a few format adjustments we download the respective info-graphic.

While this solution is fast and in most cases produces spectacular results, it is not suitable for the preparation of a tag cloud supplementing the reading journal. A reading experience is totally subjective and it cannot be described by a simple visually coded word frequency index. One of the reasons is that the words of the texts do not necessarily convey the message or the

respective impact on the reader, and the other one is the greater frequency of articles, conjunctions, demonstrative terms, and general expressions as compared to that of the relevant textual components.

Tag clouds with real education value and relevance to the given reading can be prepared not by the raw texts, but the word lists or vocabulary lists made by the user and the respective relevance index reflecting the subjective judgment of the reader. This method is ideal for natural science texts requiring the students to highlight the most important points and to visualize their findings.

Other features of suitable software include the ergonomic aspects of the operational surface, the info-graphic formation options and the usability of the given tag cloud.

It provides a competitive edge if the application includes opportunities for the setting of the colours and fonts of the given words along with the respective hyperlinks. The interactive aspects can be intensified if the user can set the outline of the total cloud.

Learners have to present the completed graphic image or provide access to it. The picture of the word cloud should be downloadable and a link facilitating graphic presentation along with an embed code should be available as well.

3.2. Info-graphics

Info-graphics originates from the field of applied graphics and entails the simultaneous application of drawing, photographs, and text. The purpose of info-graphics is the communication of information and it is more than a photograph or a written text on its own. Good infographics can draw attention, provides information, and is easily understandable, at the same time it is more complex than a drawing, and much more informative. (ISOTYPE: International System of Typographic Picture Education)

Info-graphics could be static, in which case a picture contains all the information, but there are interactive info-graphics facilitating the breakdown of the pictures to further info-graphic presentations in order to achieve more detailed information.

6. Figure Info-graphics prepared by a 7th grade student on the Eclipse of the Crescent Moon

While its most important objective is the communication of information, info-graphics due to a visual presentation and capacity of highlighting details from a vast amount of data can carry messages and direct viewer attention to the essential information with artistic quality graphic solutions.

Info-graphics can not only be useful in newspapers, but can help the teaching process as well. An ideal project task would be for students to prepare their own info-graphics. While it appears to be easy, the fulfilment of the given task requires good eyes and reliable computer programs as well. There are certain webpages exclusively made for facilitating the preparation of info-graphics. One such program is the Visme (https://www.visme.co/). By the help of the pre-arranged patterns of this program sophisticated info-graphics and presentations can be compiled. The program is free of charge.

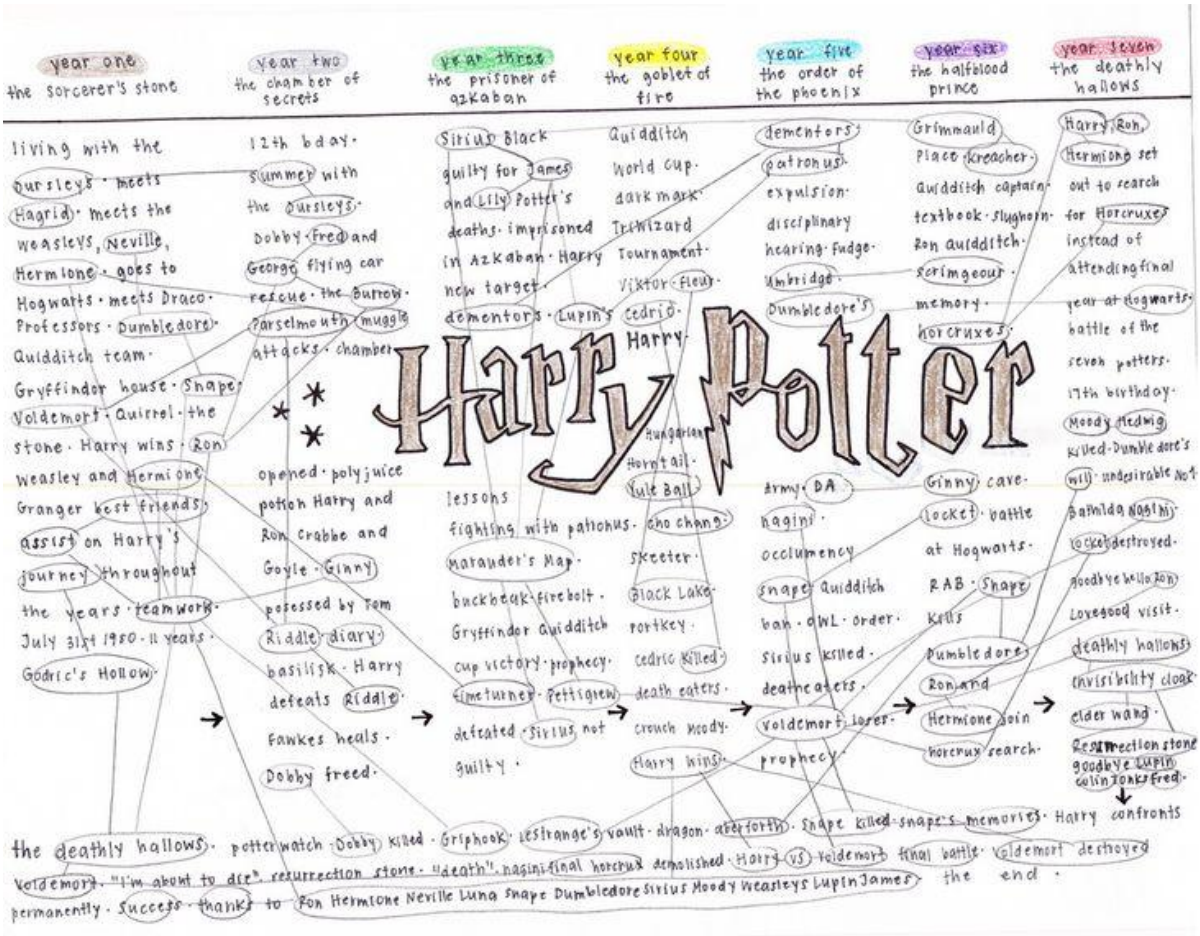
7. Figure Info-graphics on Harry Potter

3.2.1. Conceptual map

Conceptual maps express a connection between the most frequently used concepts and phenomena in the given text. Conceptual maps are used for the description of specific professional fields. The presentation of information is helped by visual images depicting the relation, hierarchical position, and connection of concepts.

Conceptual maps describing completed conceptual networks by utilizing the options provided by ICT are suitable for the illustration of the messages of ideas, books, or films.

Conceptual maps follow a certain layout as the title of the given topic is centrally positioned and the respective themes are branching out. First the main menu points, later the sub points are shown. Conceptual maps can be edited jointly and the shared picture can be exported. Certain conceptual map making programs, such as Mindomo (www.mindomo.com) integrate external links and multimedia content as well. While at the beginning they are cost free, after a certain time or duration of use such services will only be available after paying a charge.



8. Figure The conceptual map of the Harry Potter series ("The conceptual map of the Harry Potter series,")

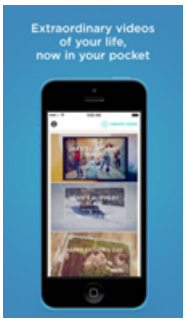
Conceptual maps are excellent for the processing of reading experiences. The conceptual map production applications are ideal to create the results of shared work efforts. There are many simple and easy to use software including Text2mindap (tobloef.com/text2mindmap), bubbl.us (bubbl.us), mindmeister (www.mindmeister.com), mindomo.com (www.mindomo.com).

9. Figure Conceptual map prepared by a 6th grade student to the Eclipse of the Crescent Moon

3.3 Digital story telling with motion picture

One of the creative methods of processing reading experiences is the use of programs facilitating digital story telling. Such programs can be used to sequence still images or motion picture slides on demand thereby facilitating the recall or retrieval of the narrated story. Crucial features include simple use, the option of the inclusion of user comments, and recording the story telling process without external devices. The respective applications provide the following options:

- Establishing the sequential order of stills and motion picture images prepared by the instructor on demand.



10. Figure Animoto Video Maker

One such suitable software is the Animoto Video Maker. The easy to use program allows the integration of photographs and motion picture images into a video. Certain preparations, however, have to be made before using the program. First a media collection or repository has to be established. The collection must include still and moving images related to the readings of the students. The stills can take the form of photorealistic images, but teachers can include illustrations from the given book. Motion picture elements can describe scenes acted out by the teacher or students. The videos should be very short, only a few seconds (the exact rendition of the plot is not a principal priority) and dialogues should only be included if it is inevitable. In order to enable students to comment on the events, dialogues should be avoided.

The program can be used on several levels. First only still images should be made. In this case the sequential ordering of the pictures is sufficient. After becoming proficient users motion pictures complemented with the narration of students or music can be prepared.

This type of storytelling can be carried out on personal computers, as the Movie Maker Live Program can be used in a Windows environment, and the iMovie can function under the OS X operation system. Both software are free and part of the operation system.

- Establishing the sequence of stills, motion picture images, and animations on demand.

11. Figure The My Story-Storybook and e-Book Maker for Kids by Teachers ("My story app,")

The My Story-Storybook and e-Book Maker for Kids by Teachers is also easy to use. The program facilitates the compilation of stories whose components are selected form pre-arranged repository of media elements. Additional features include the recording of sound and the export of the completed works in the e-Pub format.

4 Summary

Digital options for the sharing of reading experiences can not only be used during lessons, but in the non-formal education sphere as well. Libraries can increase the activity of students whose familiarity with the info-communication technologies makes them more willing to learn or start reading. These methods increase the significance of libraries along with motivating students and developing their digital literacy.

Acknowledgement

This article was supported by the Janos Bolyai Research Scholarship of the Hungarian Academy of Sciences.

References

Balázsi, Ildikó, Ostorics, László, Szalay, Balázs, Szepesi, Ildikó, & Vadász, Csaba. (2013). PISA2012 Összefoglaló jelentés (PISA2012 Summary report) Budapest: Oktatási Hivatal.

Coughlan, Sean. (2015) Computers 'do not improve' pupil results, says OECD. BBC News. Retrieved from http://www.bbc.com/news/business-34174796

Eszenyiné Borbély Mária: Pedagógus digitális kompetencia-körkép 2018. (Surveying the digital competence of pedagogues) 1. rész. = Tudományos és Műszaki Tájékoztatás 65. évf, 12. sz., 2018. pp. 627-652.

Godwin, Peter, & Parker, Jo. (2008). Information literacy meets library 2.0. London: Facet Pub.

Harry Potter info-graphics Retrieved from http://img13.deviantart.net/1181/i/2011/318/3/f/harry_potter_spells_infographic_by_seanchunseianliew-d4g8n37.jpg

ISOTYPE: International System of Typographic Picture Education: "Words Divide, Pictures Unite". http://www.designhistory.org/Symbols_pages/isotype.html

Nemzeti infokommunikációs stratégia (National info-communication strategy) 2014-2020.

Racsko, Réka. Az infografikai alkalmazásokról (Info-graphic applications).

Racsko, Réka. (2012). Alternatívák az elektronikus tanulási környezetek kialakítására.(Alternatives for the formation of electronic learning environments). Tudományos és Műszaki Tájékoztatás 59, 10.

Rövid ismertető a PIRLS és TIMSS 2011 vizsgálatokról és a magyar eredményekről. https://www.oktatas.hu/pub_bin/dload/kozoktatas/nemzetkozi_meresek/pirls/PIRLS_TIMSS_2011_tajekoztato.pdf (A brief summary of the 2011 PIRLS and TIMSS surveys and the respective results)

Rövid ismertető a PIRLS és TIMSS 2016 vizsgálatokról és a magyar eredményekről.

Forrás: https://www.oktatas.hu/pub_bin/dload/kozoktatas/nemzetkozi_meresek/pirls/PIRLS2016_tajekoztato.pdf (A brief summary of the 2016 PIRLS and TIMSS surveys and the respective results)

STEKLÁCS János: PISA 2015 után, PISA 2018 előtt. A szövegértő olvasás fejlesztésének, tanításának feladatai.(After PISA 2015, before PISA 2018: Tasks related to the development and teaching of reading comprehension) = Könyv és Nevelés: Az Oktatáskutató és Fejlesztő Intézet Folyóirata 20.évf : 1 sz., 2018. Forrás: http://folyoiratok.ofi.hu/konyv-es-neveles/pisa-2015-utan-pisa-2018-elott?abstract#main-content [2019.07.12]

Tanulói háttér vizsgálat infografikája (Info-graphics of a student background survey)

Tarcsi, Ádám, Abonyi-Tóth, Andor, & Horváth, Győző. Trendkutatás módszerei és eszközei az interneten . (Methods and devices of trend research on the Internet). In. The conceptual map of the Harry Potter series. Retrieved from https://s-media-cache-ak0.pinimg.com/736x/b5/e2/66/b5e2664b0f0c18d6bde952736b075c0d.jpg

The conceptual map of the Harry Potter series Retrieved from https://s-media-cache-ak0.pinimg.com/736x/b5/e2/66/b5e2664b0f0c18d6bde952736b075c0d.jpg

My story app. Retrieved from http://mystoryapp.org/

Short professional biography

Tünde Molnár Lengyel received PhD in the Library Science section of the Literary Science Doctoral Program of Eötvös Loránd University, Budapest in 2008, and she has two degrees, one in informatics librarian studies and another as a teacher of mathematics and informatics.

She is associate professor of the Media Informatics Department, at the Eszterházy Károly University of Eger, Hungary. Her research fields are: human performance technology, automatic preparation of text extracts, research methodology computerized data processing, evaluation and monitoring of knowledge acquisition in education, and also specialized information and reference provision.