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Theses of dissertation

Reading strategies for digital texts

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1. Introduction

Being able to access and construct information is an essential element of human knowledge (Eysenck–Kean 1997, Csapó 2002). In the 21st century, an age of information technologies, the means and ways of accessing information have changed dramatically: information is often embedded in a virtual environment, and a range of diverse informational and communicational technologies is required to access it. Since these technologies organize information in a different way than traditional, usually printed sources do, new strategies are required for readers to access and process information (Shmar-Dobler 2003).

Beside the use of equipment, literacy is another key factor in constructing informational knowledge. Today's communication relies primarily on two factors: the technology chosen to convey information, and the text created, which is often not original, but the result of selecting, organizing, screening and adapting already existing information (Gesiler et al. 2001, quoted in Koltay–Boda 2010: 61). This entails processes such as evaluating and comparing information, interpreting intended meanings, in other words, applying the elements of critical thinking, which is basically a reading comprehension strategy. The set of skills required to execute these processes is called *digital literacy* (Martin 2005).

Digital texts, being the primary medium of digital knowledge, are closely linked with human communication and cognition (Tolcsvai 2006b: 65). The physical manifestation of digital texts is special in the sense that it is always displayed on a screen as a series of signs. Processing digital texts is simultaneous, since the reader is supposed to decode verbal elements as well as copious amounts of multimedia information, thus the conceptual structure of a digital text is dependent on the reader. The elements of information in digital texts are connected to each other through key words and hyperlinks, which allow for the text to branch out, offering the reader choices to follow different pathways while navigating the text. This text structure is called *hypertext*, which, due to the differences between the features of various text elements, requires cognitive flexibility on behalf of the reader in order to process it (Nelson 1992). Based on the processes involved and the structural features, the digital text can be described in a cognitive linguistic frame as a network of information (text, image, audio) connected through hyperlinks, appearing on a screen, and if to be processed efficiently,

requiring the reader to use cognitive processes to select, organize, connect and evaluate what they read (Koskimaa 2006, Coiro–Dobler 2007, OECD 2011).

Reading, which can be interpreted as a psycholinguistic, cognitive and methodological concept, is one of the most basic cognitive processes involved in the course of obtaining information and learning (Adamikné 2006, Gósy 2008, Nagy 2006). Reading digital texts basically means processing information. This approach identifies the reading of digital texts with Internet browsing and searching for information, and regards reading as an ability which serves as the foundation for critical thinking (Eagleton–Dobler 2007). While reading digital texts, the process involves the interpretation as well as the communication and sharing of the information. The cyclic model demonstrating the reading process of digital texts consists of five steps: the first is to *ask*, the second one is to *investigate*, the third one is to *create*, the fourth one is to *discuss*, and the last one is to *reflect*, which leads to forming a new question (Bruce–Bishop 2002). In the followings, I shall interpret the reading of digital texts as a complex cognitive activity in which the literacy-related abilities and skills are supplemented by digital competence, and during which the reader locates, evaluates, synthesizes and communicates information. This type of reading process will be called *e-reading* in the followings.

As the structure of digital texts and also the purpose of their reading usually differ from those of printed texts, it is reasonable to assume that the eye movements characteristic of the reading processes and the reading patterns are also different. Nielsen and his colleagues used a device to detect eye movement in their research, and their findings have offered proof that readers do not decode website texts word by word: they only process the information in the first two paragraphs in detail, and then interpret only the first few words from each line of a continuous text. This means that the reading pattern of digital texts differs from the more or less traditional V-shape, instead, it forms rather an E or an F (Nielsen 2006).

Based on the purpose, we can differentiate between two types of reading digital texts (Bárdos 2000, Bruce–Bishop 2002, Eagleton–Dobler 2007, Golden 2009). In the first case, the reader's aim is to locate specific information through scanning one or more texts. This type of reading will be called *keyword-scanning* in the followings. The term implies that with the help of a customized key word, the reader of the digital text may make use of various features of

the computer, such as a search engine. With the other type of reading, the purpose is to locate and comprehend the main ideas through nonlinear reading patterns. This type of reading shall be called *keyword-identifying*. This term implies that the keywords are not known or decided on in advance, instead, the reader has to identify them from the text while reading. The reader's task of identifying keywords is usually aided by the fact that they mostly appear as hyperlinks, or are otherwise highlighted visually.

Similarly to printed texts, the conscious approach to reading digital texts manifests on two different levels. The first level is the cognitive one, which includes the reader's experiences and knowledge of objects, environment and actions. The second level is the metacognitive one, which contains the experiences of the reader's own reading process. The two levels have a constant and mutual impact on each other, creating the conscious reading process (Csíkos–Steklács 2006, Steklács 2013: 49). For readers, reading digital texts is a task which entails the cognitive process of searching for information. Therefore, while reading, the reader keeps making predictions about certain layers of multilayered texts, that is, the content behind the hyperlinks. Since reading digital texts requires specific types of reading, it can be assumed that the strategies applied in the reading process are also unique. 'Reading strategy is the intentional use of a cognitive process that involves selection, execution and monitoring.' (Almasi 2002, quoted by Steklács: 2013: 53) While reading digital texts the reader supplements the traditional reading strategies as cognitive processes with physical actions performed on the text. These actions, or with another term, *navigational steps* are closely connected to the certain reading strategies. Furthermore, these navigational steps cannot be performed on printed texts at all, which means that those readers who are not familiar with opportunities offered by navigational steps will probably fail to complete reading comprehension tasks in a digital environment.

The main features of reading digital texts are summarized by Image 1. from the aspects mentioned in this chapter.

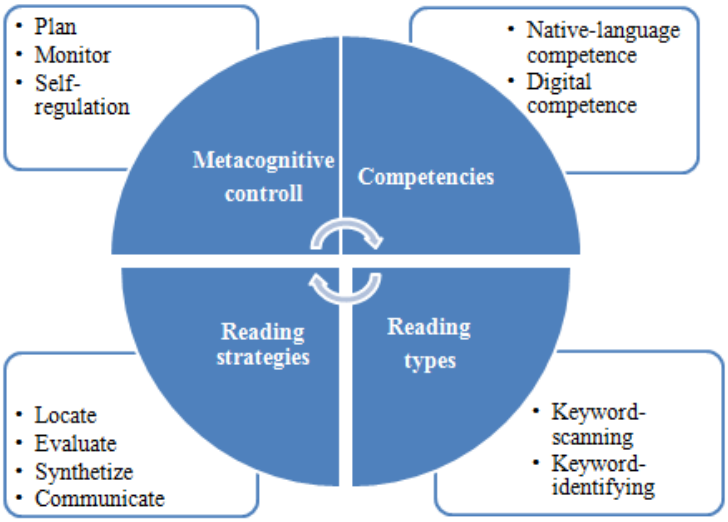

Image 1. Features characterizing digital reading

2. The goals and hypotheses of the research

The goal of the research is to identify the reading patterns of digital texts and the strategies used while reading by empirical methods. Additionally, the research is aimed at specifying the order of efficient reading strategies related to different types of reading. One benefit of describing the reading patterns, the strategies, and the procedures made up from these strategies could be the development of the literacy of digital texts.

The first hypothesis of the research is that the reading pattern of digital texts is different from that of printed texts, which is traditionally of a linear nature. Accordingly, digital texts are not read from the right to the left and word by word. Instead, depending on the information on the website, readers progress through the text and process the different elements in jumps.

The second hypothesis of the research is that the use different reading strategies and the actions performed on digital texts, that is, the navigational steps are inherently linked, which is to say that each reading strategy can be associated with a different navigational step. Furthermore, during the analysis of the process of reading digital texts, it will be possible to

identify reading strategies that arise due to the characteristics of digital texts, and the use of which is feasible exclusively in an electronic environment.

According to the third hypothesis of the research, while reading digital texts, different reading strategies will prove efficient depending on whether the reading comprehension task requires a *keyword-scanning* or a *keyword-identifying* type of reading. This difference will be apparent not only in the use of strategies, but also in applying different navigational steps.

The fourth hypothesis of the research concerns the performance of the informants both in terms of reading comprehension results and the use of strategies. It is postulated that on average girls will perform better in the reading comprehension of digital texts and will use reading strategies more efficiently than boys. However, it is also anticipated that both the most and the least efficient reader will be found among the boys.

The fifth hypothesis also concerns the results of the reading comprehension of digital texts and the efficient use of strategies. It is assumed that the students from a secondary grammar school in the capital are likely to score higher in the reading comprehension task than the students from a secondary school in the countryside. Additionally, the students from the secondary grammar school in the capital will probably prove more efficient in using reading strategies in the case of digital texts than the students from the secondary school in the countryside.

3. Instrument, method and informants

Two different empirical researches have been conducted in order to reach the goals of the research and to prove or discard the hypotheses. Two studies instead of one ensured that the findings about reading strategies for digital texts were more detailed and provided a more concise overall picture. One of the empirical researches (from now on, *Research 1.*), which, due to its method and instrument, allowed primarily for the examination of metacognitive processes and the efficiency of reading strategies, was basically a qualitative research. Due to the special equipment (eye-tracker), the other research (from now on, *Research 2.*) allowed me to conduct an in-depth analysis of the reading process itself, the reading pattern characteristic of digital texts. This latter research was essentially a quantitative one.

Research 1. was conducted in the academic year 2012-13, by means of the structured interview and the think-aloud protocol. *Research 2.* was carried out in 2013, also with the help of the structured interview. Both empirical researches *1.* and *2.* involved 15 and 16-year-old secondary school students, who were keen and skilled readers of Internet texts. *Research 1.* involved 120 students, while in *Research 2.* I worked with a reduced number of informants (20 students altogether) matching the features of the first research. The students had to complete a reading comprehension task via the Internet in both researches. The application used in *Research 1.* was a Microsoft Debut Video Capture software, whereas in the second research I made use of a Tobiit120 eye-tracker. The findings of *Research 1.* were evaluated with the help of a decoding guide that I developed myself, and the results were saved on a PC in .wme, .avi and .doc formats. The statistical calculations were done in Microsoft Office Excel 2007 and SPSS version 20. The findings of *Research 2.* were evaluated by the eye-tracker's own software, TobiiStudio.

4. Findings

In empirical *Research 1.*, the informants had to complete two reading comprehension tasks. The first one required the readers to use the *keyword-scanning* type of reading, in the second the *keyword-identifying* one. The results of the reading comprehension tasks were as follows: in the *keyword-scanning* type of reading 47 efficient, 61 good and 12 poor readers were identified. On the other hand, in the *keyword- identifying* type of reading 76 readers proved efficient and 44 good. The *keyword-scanning* type of reading task in *Research 2.* was completed by 12 informants efficiently, and by 8 students well.

Reading comprehension performance can be categorized on the basis of the reading pathways that the readers follow while completing the task. The *reading pathway* consists of a navigational process among digital texts and the cognitive processes required to execute the navigation. The actions performed on the text required to complete the reading pathway are called *physical reading actions* (Cohen–Cowen 2007, Coiro–Dobler 2007). Those students who chose the shortest pathway to complete the task are called *efficient readers*, while those students who failed to decide on the ideal reading pathway, but still completed the task, belong to the group of *good readers*.

The difference between the number of students in each category can be accounted for by more than one reason. Firstly, the reading process based on *keyword-scanning* consists of two navigational steps: first using the browser and the search engine, then navigating the website. On the other hand, completing the second task entails only one navigational step: navigating the website. Consequently, only by efficiently completing both steps can the reader prove efficient in the first task, which is to say that in terms of cognitive processes used while reading, the first task can be regarded as more complex (Leu et al. 2010, Spiro 2004). Other factors affecting the efficiency of task completion are the informant's navigational skills, prior knowledge and the reading strategies applied.

There is no correlation with mathematical proof ($p < 0,05$) in the results of the *keyword-scanning* type of reading task in *Research 1.* between girls and boys, or students from the capital and from the countryside ($r = -0,091$, $p = 0,320$; $r = 0,013$, $p = 0,887$). The results were similar in the case of the *keyword-identifying* type of reading task in *Research 1.*, which also lacks a correlation with mathematical proof ($p < 0,05$) between girls and boys, or the students from the capital and those from the countryside ($r = 0,035$, $p = 0,708$; $r = 0,104$, $p = 0,259$).

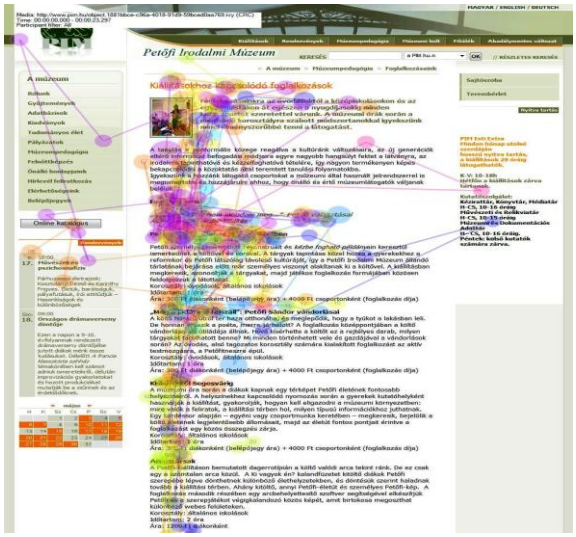

Image 2. The fifth station in the readingpathway of boys on an eye-tracker map (N = 10 persons)

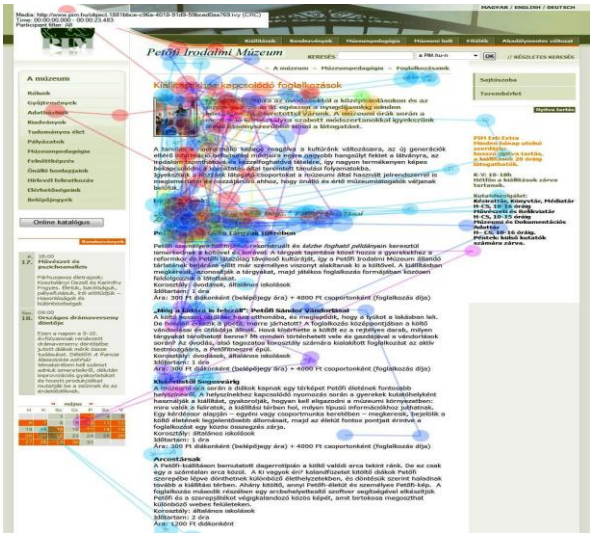

Image 3. The fifth station in the reading pathway of girls on an eye-tracker map (N = 10 persons)

The second empirical research, however, provides us with a greater understanding of the correlation between the figures. As it can be seen on the eye-tracking map (see images 2. and

3.), significantly less girls than boys continued processing the website after having located the target information. According to the eye-tracker map, boys applied the self-regulated connecting strategy not only to identify, but also to check information, while the priority aim for girls was only to identify information. It can also be observed that boys read in a more focused way that girls did. The eye-movement for most of the boys was concentrated in the central, most meaningful part of the website, whereas more girls spent time processing irrelevant information while completing the task. Based on the information provided by the eye-tracker maps, it seems valid to say that boys are more skilled navigators than girls, they navigate a website more easily and show more confidence following a personal reading pathway.

Informants used two types of navigational steps in both the first and the second empirical research. The *navigational steps organizing the reading process* are used to construct and follow the reading pathway, which means that these steps are necessary for the reader to display the various text elements of the multilayered text on the screen. The navigational steps organizing the reading process include: *clicking on an icon, typing in the search window or search bar, using Enter, clicking on one of the search results, clicking on the text or part of the text (hyperlink), clicking on a menu item.* On the other hand, *navigational steps supporting the reading process* serve as a means to help the reader explore and process the digital text displayed on a single webpage (Cohen–Cowen 2007). This category includes: *following eye-movement with cursor movement, scrolling, pointing at keywords with cursor, highlighting the text*. Navigational steps in the reading process are related to cognitive processes such as previewing the text, repair processes and evaluation.

Image 4. demonstrates the percentage distribution of navigational steps characterizing the two types of reading processes based on the reading processes of informants in *Research 1*. It is apparent from the figures that the use of navigational steps organizing the reading process was more prevalent in the *keyword-scanning* type of reading, while in the *keyword-identifying* reading type it was the navigational steps supporting the reading process that were more dominant. Based on the results as well as the analysis of the aim of different navigational steps, we can conclude that in the *keyword-scanning* type of reading it was the reading pathway that determined the reading process, which means that the number of efficient solutions can be accounted for by the digital competence of the informants. In the *keyword-*

identifying type of reading, however, it was the interpretation of the text on the given webpage that played a central role, therefore, mostly native language competence was responsible for the efficient task completion, similarly to the results of the reading comprehension tasks of digital texts in the 2009 PISA-test (Balázsi et al. 2011).

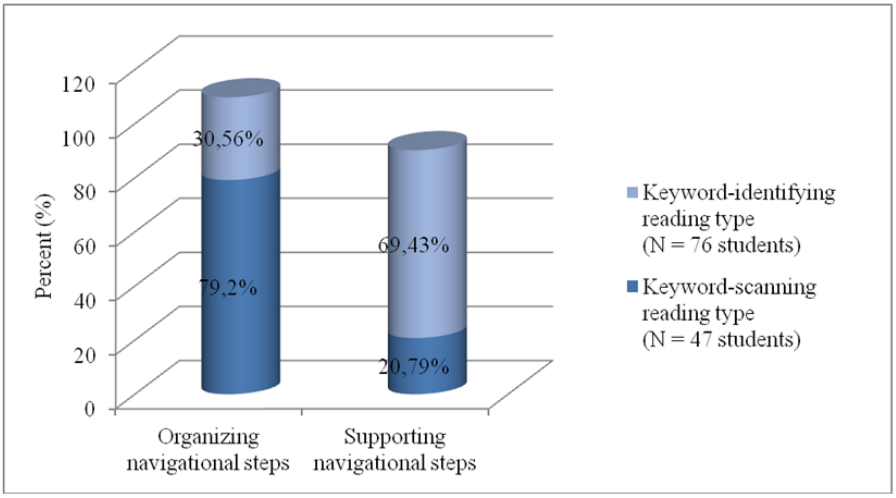

Image 4.

The percentage distribution of the navigational steps used by efficient readers in the first empirical research

Reading strategies used in reading processes can be divided into two categories in terms of their execution. The group of *text-reading strategies* includes those strategies that can be executed on printed texts as well as digital ones, such as the following: *activating prior knowledge of topic and text structure; inferential prediction of word meaning, text structure and content; and self-regulating repair strategies*. On the other hand, *digital text-reading strategies* are those that can be used only when reading digital texts, such as *activating prior knowledge of the system and structure of websites, and the use of search engines; inferential prediction of other parts of the text and the elements of multilayered texts; and the self-regulating, connecting, navigating and information-seeking strategy.* The detailed explanation of the reading strategies can be found in Table 1.

Reading strategy	Explanation of concept
Activating prior knowledge of the topic	Referring back to the situation or question on the worksheet
Activating prior knowledge of text structure	Comparing the text displayed on a single webpage to printed texts
Activating prior knowledge of the system and structure of websites	The knowledge of how different menu items and contents are typically located
Activating prior knowledge of the use of search engines	Designing a keyword and typing it in the search window
Inferential prediction of word meaning	Inferring and predicting the meaning of menu items, hyperlinks or titles, captions
Inferential prediction of the text structure	Recognizing the connection between text elements displayed on a single webpage or on a website
Inferential prediction of the content	Recognizing the content-related connections between text elements displayed on a single webpage or on a website
Inferential prediction of other parts of the text	Predicting the existence of texts parts on the same website, but not on the same webpage
Inferential prediction of the elements of multilayered texts	Recognizing interconnections between digital texts, predicting the existence of further texts
Self-regulated repair strategy	Recognizing the error in the reading process; error correction
Self-regulated connecting strategy	Connecting various strategic elements of the reading process; evaluation of the personal reading process; self-monitoring
Self-regulated navigating strategy	Intertwining the physical reading action organizing the reading process with cognitive strategies
Self-regulated information-seeking strategy	Selecting the appropriate search result; executing a rapid information-seeking cycle

Table 1.

Reading strategies for digital texts

Image 5. shows the percentage distribution of reading strategies used by informants in relation to the different types of reading. In the *keyword-scanning* type of reading readers used reading strategies 2400 times altogether, out of which 705 were reading strategies, and 1309 were

digital reading strategies. This means that efficiently completing the task required using reading strategies in 29,37% and digital reading strategies in 70,62%. In contrast, in the case of the *keyword-identifying* reading type both strategies were used in almost the same proportion. While completing the second task, readers used a reading strategy 2895 times, out of which 1390 counted as a reading strategy, and 1505 counted as digital reading strategy, which means that a balanced use of the two types of reading strategies (48,01% and 51,98%) lead to efficient task completion.

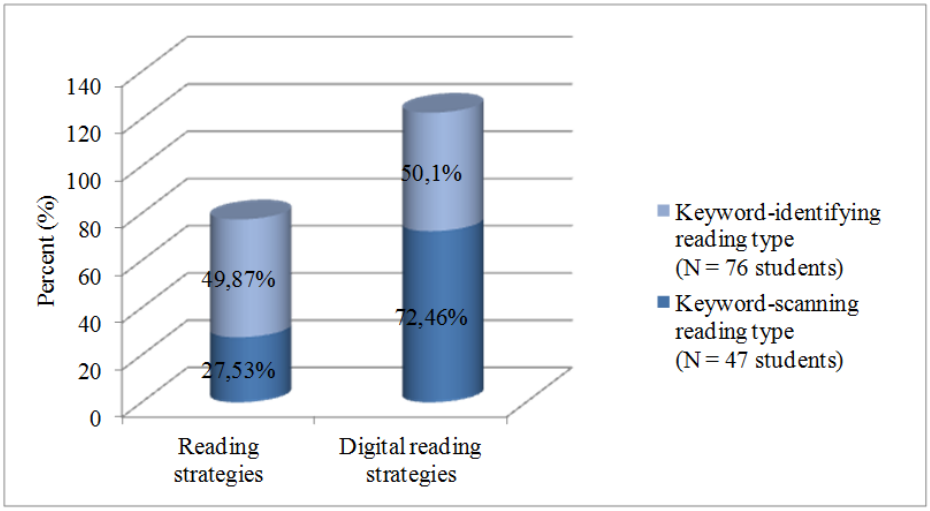

Image 5.

The percentage proportion of reading strategies used in relation to the two types of reading

Although both tasks require the execution of a complex information-processing activity, in which both digital and native language competences play an important role, after analyzing the navigational steps and reading strategies used, a shift in proportions can be observed in the use of skills related to the respective competences. In the *keyword-scanning* type of reading digital reading strategies, and, accordingly, navigational steps organizing the reading process are key, that is, the determining factor is the students' digital competence. In the *keyword-identifying* type of reading the two types of reading strategies are represented in the same proportion, however, significantly more navigational steps supporting the reading process were applied compared to the ones organizing it. Therefore, it can be concluded that in this task type the determining factor is more the native language competence than the digital one (Balázsi et al. 2011).

The essential role of native language competence is also shown in Table 2., which summarizes the results of the second empirical research by displaying the values measured in relation to the stations of the ideal reading pathway. It can be seen from the figures of the table that considering the duration of saccades and fixations, the average duration of fixations measured in international studies of printed texts is the same as that of digital texts (200-250 ms) (Rayner et al. 2004, Steklács 2014). This means that while reading digital texts readers also focus primarily on the content elements of the language, as well as the more complex, intricate images (Nilesen 2006). Furthermore, the above observations also imply that reading digital texts and processing information on websites does not require the reader to perform more complex cognitive processes than in the case of printed texts.

Station of the ideal reading pathway	**Average number of fixations (pcs)**	**Average duration of fixations (sec)**	**Average duration of all the fixations (sec)**	**Average time spent at station (sec)**
1. station	40,35	0,24	9,69	9,73
2. station	47,25	0,25	11,97	14,36
3. station	65,05	0,22	14,57	17,53
4. station	63,95	0,21	13,68	16,32
5. station	33,3	0,2	6,67	8,75

Table 2.

The findings of the eye-movement tracking (N = 20 persons)

While in the case of the first empirical research it is only the examination of the reading process that suggests that the reading pattern of digital texts differs from that of traditional texts, the heat maps recorded during the second empirical research make the difference absolutely clear.

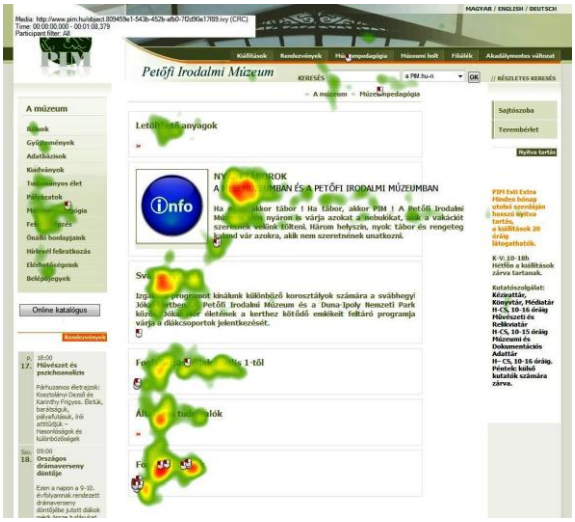

Image 6.

The heat map of the third station of the ideal reading pathway (N = 20 persons)

Image 6. confirms that the students taking part in the research showed a reading pattern that was identical with that of the readers in the international studies, that is, both showed an E- or F-shaped pattern, which depended on the amount, quality and structure of the information displayed on the webpage. The findings of this study also correspond to those of other researches in that the readers focused mainly on the language elements which were also visually highlighted, the bullet pointed parts of the text, and the icons serving as a means to continue on the reading path (Nielsen 2006, Steklács 2014).

5. Developing the reading comprehension of digital texts

In secondary schools the development of both reading and constructing digital texts is a priority issue. Students should be able to gather information on their own, and to evaluate and adapt it to their own purposes. In this stage of education students are supposed to be skilled at both the keyword-scanning and keyword-identifying type of reading. Designing reading comprehension tasks according to the reading models of *Research 1.* could contribute to the demonstration, acquisition and development of efficient reading strategies that belong to the two types of reading. The findings of the second empirical research could foster the efficient reading of various types of websites, since students need to be able to comprehend and interpret texts in electronic environments not only in academic settings, but also in different fields of everyday life including social life, working environments and fulfilling civic duties.

Additionally, the analysis of electronic literature can also be part of the secondary school curriculum.

The efficient use of ICT devices in methodology to display digital texts should be an essential part of teaching skills, acquired already in teacher training. With the changes in the teaching and learning processes, it is necessary to introduce a new concept of teacher competence, which defines the knowledge of an innovative educator in a complex way. The adaptive use of informational and communicative technology has become just as important a part of teaching as suitable content and methodology. Creating the so-called TPCK-knowledge (Technological Pedagogical Content Knowledge) in future teachers does not only necessitate the acquisition of ICT competences, but teacher training should also guarantee that undergraduates have the chance to use the technological skills acquired and their knowledge of content material and methodology simultaneously (Kelemen 2008).

The teaching of reading strategies for digital texts can be divided into two categories: the first category includes lesson plans aimed at developing the student's reading comprehension, and the second one includes strategies that develop reading skills before, during and after reading (Matthew–Felvégi 2009). Since reading digital texts can be essentially interpreted as a complex information-processing task, in the rest of this paper I will outline methods which can be suitably adapted to virtual environments, and which are mainly aimed at complex strategy development.

One example of the complex strategy-development methods is Directed Reading Activities, which consists of the following elements: preparation of the reading text, silent reading, discussion of the text, and finally the Directed Reading Thinking Activity, which focuses on defining the goal of the reading process (Matthew–Felvégi 2009). The so-called Listen, Read, Discuss complex developmental method can also be adapted to a virtual environment. The first step of this method is that one or two students give a presentation on the topic in question, then students read the text, and finally they discuss the content (Matthew–Felvégi 2009). Mental modeling is another complex and efficient method to develop the use of reading strategies. The essence of this method is that the teacher demonstrates how he or she uses each strategy to construct meaning. The demonstration is followed by guided practice in pairs or in smaller groups with the constant supervision of the teacher (Tóth 2006).

A common feature of the methods outlined is that they should be carried out under the supervision and guidance of the teacher, which means that the efficacy of the given method depends on the communication and ICT-competences of the teacher (Holló et al. 1996). The appearance of ICT-devices can also alter the traditional communication between student and teacher, and thus it can affect the teaching of different reading strategies. It is essential to adapt to the changing nature of interaction within the classroom in order to develop reading strategies for digital texts.

6. Conclusions

It can be concluded from the findings of the empirical researches that the students who are skilled readers of digital texts will not find it difficult to locate and identify information in an electronic environment, since out of the 140 students involved in the two researches 128 completed the given reading comprehension task well or even efficiently. This means that 91% of the informants possess the kind of cognitive flexibility that is required to process different types of information and to construct and follow a reading pathway (Coiro–Dobler 2007).

If we group the reading comprehension performance of the students according to reading types, we find that readers were less successful in using reading strategies connected to *keyword-scanning* than strategies connected to *keyword-identifying*. Summarizing the findings of the two empirical researches, we can see that while 42% of the students completed the task efficiently in the *keyword-scanning* type of reading, this figure amounts to 63% in the *keyword-identifying* type of task. This may lead us to believe that students used the reading strategies mostly connected to *keyword-identifying* with greater efficacy, which means that they are more successful using strategies that work similarly in the case of printed texts. This explains why the development of reading digital texts should be based on the native language competence in the future. This idea is further supported by the results of the second empirical research, according to which the average duration of the fixation of the informants reading digital texts is the same as the average duration of fixation measured while reading printed texts, which suggests that the information-processing of digital texts is similar to that of printed texts.

Based on the reading processes examined in the first and second empirical research, it seems reasonable to say that informants use navigational steps supporting reading in order to overcome the stress they experience while reading (Nilson 2003). Processing digital texts can cause frustration in the reader due to the fact that they cannot immediately assess the size of the given digital text, and that they constantly have to make predictions about the other elements of a multilayered text, the size and content of which also remain unknown.

Other conclusions can be formulated in connection with the navigational steps organizing the reading process based on the second empirical research. It can be observed on the videos showing the reading process that before the reader would continue to follow their personal reading pathway, the duration of fixation increases before clicking on an icon or a menu item, compared to the fixation time needed in order to process other information in the text. This means that continuing on the reading pathway means a genuine decision-making situation for the informants, in which they have to make predictions about the other elements of the multilayered text.

Considering the proportion of reading-supporting and reading-organizing navigational steps recorded in *Research 1.* and 2., it can be established that reading strategies are based on the native language competence of students, while digital reading strategies are based on their digital competences. This can also lead us to the conclusion that there is a strong connection between reading strategies and the navigational steps used. In the reading process of digital texts the complex cognitive processes, the reading strategies and the actions performed on the text, i. e. the navigational steps correspond to the elements of information-processing.

7. Theses

1. Thesis: I will call the reading process of digital texts *e-reading*, in which the knowledge elements of the skills and abilities required are determined essentially by the native language competence and the digital competence. Native language competence is primarily made use of by reading strategies, whereas digital competence is necessary for digital reading strategies. Reading strategies are complemented mainly by navigational steps supporting the reading process, which do not contribute to the construction of the reading pathway, but help the

reader to process the text on the screen. These navigational steps are applied within the confines of a single webpage. Digital reading strategies are executed through navigational steps organizing the reading process, and these play a role in building the personal reading pathway.

2. Thesis: Readers use navigational steps organizing and supporting the reading process in order to execute various cognitive processes. Such cognitive processes are the assessment, which refers to the exploration of the digital text in different ways; repair processes, when readers divert from the reading pathway required for obtaining the information; and checking, which helps the readers confirm that they located the right information in the given digital text.

3. Thesis: Although native language competence and digital competence are interrelated in the course of e-reading, a shift can be observed in the proportional use of the skills and abilities belonging to the two competences, depending on the type of reading. In the *keyword-scanning* type of reading digital reading strategies and the navigational steps organizing the reading process play a decisive role, that is, the dominant competence at work is the digital one. In the *keyword-identifying* type of reading the two types of reading strategies are present in the same proportion; however, significantly more reading-supporting navigational steps were taken by the students compared to the number of reading-organizing navigational steps. Therefore, we can say that in this type of task it is the native language competence that domineers (Balázsi et al. 2011).

4. Thesis: The fixations measured while reading printed texts in international studies have the same average duration as the fixations recorded while reading digital texts (200-250 ms) (Rayner et al. 2004, Steklács 2014). This means that while reading digital texts readers focus primarily on the content elements of the language and the more complex and intricate images (Nielsen 2006). From this we can infer that reading digital texts and processing information on websites does not require the reader to perform more complex cognitive processes than in the case of comprehending printed texts.

5. Thesis: The reading patterns of the students who took part in the study are the same as the reading patterns of informants in international researches, and which depends on the amount,

quality and structure of the information displayed on the webpage. In the research the students processed informational websites in an F- or E-shaped pattern, while they used a patch-like pattern for websites requiring navigation (Nilesen 2006, Steklács 2014).

6. Thesis: The difference between the reading comprehension performances of boys and girls is not significant; however, the analysis of their reading process can highlight some features that are unique to either just the boys, or just the girls. Boys seem to be in possession of greater navigational skills than girls, they navigate a given website more easily, and make use of a personal reading pathway more confidently. This suggests that their reading processes are primarily built on their digital competence. On the other hand, girls focus more on activating prior knowledge compared to boys, they also tend to explore the given website in greater detail, and consequently they use more reading-supporting navigational steps, and thus rely mainly on their native language competence.

7. Thesis: In conclusion, based on the findings the development of reading strategies and the comprehension of digital texts should be rooted in the native language competence. Designing practice tasks aimed at developing the above mentioned skills should be based on the three-level model of the keyword-scanning and keyword-identifying type of reading, which consists of the reading pathway, the actions performed on the text and the reading strategies applied.

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