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Anything New Here in Story Apps? A Reflection on the Storytelling Mechanism across Media

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This paper starts with a question of whether app storytelling is different by examining story apps alongside other platforms of storytelling. With an interdisciplinary approach, this paper constructs an original model of the storytelling mechanism. Based on the mechanism and with particular focus on the mechanical layer of storytelling in various media, this paper proposes an original typology of narrative texts. With demonstrations of four text positions in the typology, this paper shows that the narrative strategies used in story apps are evident on one or another platform of storytelling. The finding suggests that, although story apps can be approached with a focus on the touchscreen and its affordances, it is not necessary to pay attention to the touchscreen when we try to understand how story apps work. This is because those children's narrative texts can be studied and may be taught independently of the medium.

Keywords: children's literature, interdisciplinary, mechanical textual behaviour, medium, story app, storytelling mechanism, typology

Introduction

For several years, computer technology has been moving stories from page to touchscreen, from storybooks to story apps which are also known as narrative apps (e.g. Turrión 2015), picturebook apps (e.g. Al-Yaqout and Nikolajeva 2015), or digital picturebooks/picture books (e.g. Yokota 2015). Nowadays, story apps have become one of the first entertaining/educating objects that most children may

come across at home/school. To understand how story apps work has become an urgent item on the agenda of children's literature scholars. However, although much attention has been given to the implication of story apps for literacy education (e.g. Manresa and Real 2015; Wooten and McCuiston 2015; Yokota 2012, 2015; Yokota and Teale 2014), just as Ghada Al-Yaqout and Maria Nikolajeva (2015) point out, less attention has been paid to the story apps themselves.

So far, a limited amount of research actually investigates how story apps tell stories (e.g. Schwebs 2014; Stichnothe 2014; Turrión 2014, 2015), most of which is essentially based on the question of *how* app storytelling is different from other ways of storytelling, with particular focus on the interactive and multimodal features brought by touchscreen technology. Instead of investigating how storytelling is different on a touchscreen, this paper takes a step back and questions *whether* app storytelling is different in the first place. The investigation will examine story apps by situating them among many other platforms of storytelling, such as books, films and computer games. With a focus on the mechanism of the formation and the arrangement of signs, rather than an interpretation of the signs, the research asks four specific questions:

1. What are the basic elements of storytelling?
2. What has or has not changed in storytelling with the appearance of story apps?
3. Are these changes, if there are any, dependent on a particular medium such as a touchscreen?
4. Is it necessary to pay attention to the touchscreen when we study app storytelling?

As the story app is a hybrid of various media, and as it lies at the intersection of the interests of various disciplines, it is not enough merely to rely on a single theory from a single discipline to understand how story apps work. In fact, we do not have any existing theory adopted in children's literature studies that is ready for use for story app analysis. Aiming to bridge the gap, this paper takes an interdisciplinary approach, combining children's literature, narratology, media studies, social semiotics and game studies, and proposes an original model of the storytelling mechanism as well as an original typology of narrative texts to study story apps. With the model and the typology, this paper hopes to break the barriers set by different media in the academic discourse of storytelling, and to demonstrate that in the aspect of how signs are formed and placed, the narrative strategies of story apps are similar to those on many other platforms of storytelling, and the discourse of how story apps work can be free of the touchscreen, or the computer technology which can be seen as the medium of app storytelling.

To elaborate on the argument, this paper will start with a discussion of the basic elements of storytelling where both conversational and non-conversational, and digital and non-digital storytelling are concerned. By reviewing the relevant literature related to the elements, this paper will justify why the investigation focuses on the formation and arrangement of signs. The key concepts under discussion will be clarified before an original typology of narrative texts is introduced and applied. The implications of the typology for future relevant studies will be discussed at the end of the paper.

The storytelling mechanism

According to Eileen Colwell, "[s]torytelling is made up of three essential elements, the story, the storyteller and the audience" (1980: 2). Although what Colwell discusses is oral storytelling, while a broader sense of storytelling in narratology and media studies may refer to both conversational (oral) and non-conversational storytelling (e.g. Bal 2009; Chatman 1975; Fludernik 2009; Rayner, Wall, and Kruger 2001; Ryan 2004), she nevertheless points out three essential elements for making storytelling in a broader sense possible: the story that is intended to be told, the medium to present the story, and the people to receive the story. These three elements are referred to by Espen Aarseth (1997), a founding figure in game studies, in his cybertext theory as the verbal sign, the medium and the human operator, three ends of a textual machine. In Aarseth's words (21):

> [T]he text is seen as a machine – not metaphorically but as a mechanical device for the production and consumption of verbal signs. [… A] text must consist of a material medium as well as a collection of words. The machine, of course, is not complete without a third party, the (human) operator, and it is within this triad that the text takes place. […] The boundaries between each part can be defined only in terms of the other two. Furthermore, the functional possibilities of each element combine with those of the two others to produce a large number of actual text types.

The term "text" used by Aarseth is different from that used by linguistics and semioticians. For Aarseth, "the word [is used] for a whole range of phenomena, from short poems to complex computer programs and databases" (1997: 20–21). What Aarseth describes here can be considered as an even broader sense of storytelling, as it includes computer programs and databases, but it can also be considered as a narrow sense of storytelling, since it only considers verbal signs, while visual signs, as discussed in picturebook theory (e.g. Nikolajeva & Scott 2001/2006; Nodelman 1988), can also tell stories. In spite of this, Aarseth's insight of a textual machine together with Colwell's understanding of oral storytelling seem to suggest that storytelling can be viewed as a mechanism where the three elements, the signs/story, the medium/storyteller, and the human operator/audience influence each

other to finally generate a version of narrative. At this point, it has to be clarified that the term "text" used throughout this article is similar to Aarseth's text, i.e. "a mechanical device", but is broader than his as it includes all kinds of signs that can form or be used in a story.

For the sake of argument, this paper proposes three terms to refer to these three essential components for both conversational and non-conversational, and digital and non-digital, storytelling. The three terms are: the *narrative content*, the *medium* and the *interpreter*. The *narrative content* refers to the story intended to be told, i.e. signs that include, but are not limited to, visual, verbal and audio signs, as storytelling tends to stimulate as many human senses as possible. The *medium* refers to the physical agency via which the narrative content is *directly* presented. The medium can be stable or unstable. Briefly, a stable medium is something that is consistent considering its performance, such as a piece of paper or a (touch)screen; an unstable medium is not consistent in terms of its performance, such as a human being (storyteller, singer, actor, actress, etc.). Considering that an unstable medium contains variables that are beyond the scope of discussion of this paper, the concept of medium under consideration in this paper will only be the stable medium. The third component of storytelling is the *interpreter* who receives and interprets the narrative content. The reason for using interpreter in this paper instead of other terms is that for people who interact with story apps, they are both players and readers, as well as audience and users. However, whatever the roles, people will need to have meaning-making skills to proceed with what they start with, i.e. they need to interpret to get the story. Therefore, interpreter seems to be a more general term that can address a person in any narrative context, such as a play, a film, a video game, a story app, and a book.

The narrative content plays a decisive role in the choice of the medium, while the chosen medium directly influences the presentation and the reception of the narrative content (e.g. Ryan 2014). Meaning is made by the interpreter by working with an integrated body of the medium and the narrative content. The relationship among the three elements is generated by the author of this paper into a comprehensible mechanism shown in Figure 1 as the ***storytelling mechanism***. In this mechanism, the gear of the interpreter does not touch the gear of the narrative content. This is because the interpreter and the narrative content cannot influence each other without contacting the gear of the medium. Though called a mechanism, this storytelling mechanism is considered to have two layers, the mechanical layer where the arrangement and the formation of signs are concerned, and the interpretative layer where meaning-making is concerned. The two layers will be further discussed below.

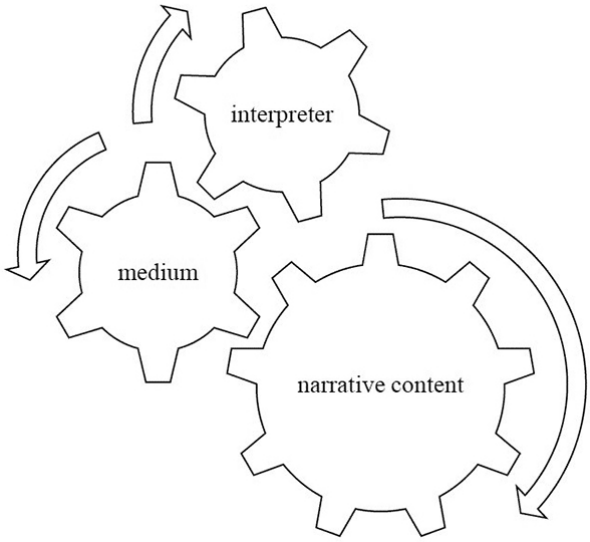

Fig. 1. The storytelling mechanism
Slika 1. Mehanizam pripovijedanja

Mechanical textual behaviour

With the appearance of story apps, what seems to have changed in the storytelling mechanism is how signs are generated, formed and placed, or in other words, the relationship between the medium and the interpreter. As suggested by many studies on story apps, such a relationship seems to involve more interaction among the interpreter, the medium and the narrative content than those on other platforms of storytelling (e.g. Al-Yaqout and Nikolajeva 2015; Schwebs 2014; Stichnothe 2014; Turrión 2014, 2015; Yokota 2015). What brought the change is the change of the medium, i.e. the touchscreen. Therefore, it is necessary to start the investigation of app storytelling by questioning the role of the medium in the storytelling mechanism.

In the discourse of storytelling, scholarship so far has investigated all these three elements in the storytelling mechanism, but with different degrees of attention. In children's literature where both digital and non-digital texts are concerned, much has been done on the narrative content with approaches from narrative theory (e.g. Nodelman 1988; Stichnothe 2014), literary theories (e.g. Hunt 1991; Turrión 2014), postmodernism (e.g. Sipe and Pantaleo 2010), rhetoric (e.g. Nikolajeva 2002), semiotics (e.g. Nikolajeva and Scott 2001/2006; Sipe 1998), aesthetics (e.g. Nikolajeva 2005, 2015; Schwebs 2014; Sipe 2001), genre studies (e.g. Nodelman 2008), etc., and on the interpreter from reader response theory (e.g. Arizpe and

Smith 2016; Arizpe and Styles 2004), educational perspective (e.g. Bus, Takacs, and Kegel 2015; Manresa and Real 2015; Meek 1988; Sipe 2007; Wooten and McCuiston 2015), cognitive approach (e.g. Nikolajeva 2014), childhood studies (e.g. Grenby 2011), etc. However, not many studies have focused on the role of the medium in storytelling. For those that have, such as studies on picturebooks and story apps, most of their focus is on the *interpretative level* of the influence of the medium on the storytelling mechanism, i.e. due to the design/materiality of the medium, paper as the medium of picturebooks and the touchscreen as the medium of story apps can influence the interpreter's perception and interpretation of the narrative content (e.g. Al-Yaqout and Nikolajeva 2015; Beckett 2013; Doonan 1986; Nikolajeva and Scott 2001/2006; Nodelman 1988; Sipe 2001; Sipe and McGuire 2006). However, the *mechanical level* of the influence of the medium on the storytelling mechanism has been neglected for a long time.

On a mechanical level, the nature of the medium influences the arrangement of signs. Such an arrangement is addressed by this paper as *mechanical textual behaviour*. Specifically, *mechanical textual behaviour* is defined by the author of this paper as the actual arrangement of signs on the medium of storytelling, and such an arrangement is decided by the nature of the medium while it is influencing and influenced by the interpreter's act upon the narrative content via the medium (such as lifting a flap in a picturebook, turning a page, activating a hotspot on a touchscreen, etc.). It is thus clear that it is the influence of the medium on the mechanical textual behaviour that subsequently affects what the interpreter receives and how the interpreter reacts to the narrative content. It is thus very important to understand the mechanical layer of the storytelling mechanism before moving to the interpretative layer. Therefore, the following discussion will focus on the mechanical layer of the storytelling mechanism with particular focus on the mechanical textual behaviour and its relationship with the interpreter's action on the narrative content via the medium. The interpretative layer of the storytelling mechanism, i.e. how the narrative content can be interpreted together with the meaning-making process, will not be covered in this paper.

Medium

As the discussion is about the mechanical layer of the storytelling mechanism, the concept of the medium needs clarification. The definition of medium varies in different disciplines. In this paper, medium is used strictly as a physical conduit for directly presenting narrative content for the purpose of storytelling; such a conduit is not regarded as passive, but is seen as being actively involved in shaping and influencing the formation and the reception of the narrative content. This is an

interdisciplinary definition as it partially takes the definitions of the medium from media studies, narratology, social semiotics and cybertext theory in game studies, but it is also different from any definition in these disciplines in terms of the ground where it stands.

Firstly, in media studies, "media" most of the time can be read as a shortened term for mass media, and are often studied in the context of culture and society (e.g. Durham and Kellner 2009; McLuhan 1994; Rayner, Wall, and Kruger 2001). In this paper, "media" is not a short term for mass media, but is used solely as the plural form of "medium" referring to material channels for presenting the narrative content. Moreover, the focus of this paper is not on the cultural influence on/of the medium, but on the influence of the medium on the mechanical textual behaviours which consequently influences the interpreter's actions upon the narrative content.

Secondly, in the studies of narratology, "medium" is considered as "a wide variety of phenomena" which is similar to the understanding of medium in media studies (Ryan 2014: 468). For example, in narratology, music and painting are considered as media of art, while printing is the medium of writing (ibid.). However, the concept of phenomena is too broad for the purpose of this research. Instead, "medium" in this paper is used as an actual physical conduit to carry and to influence the information. For example, for this research, music will not be considered as a medium, but as an art or narrative form, while musical instruments are media of music; language, images, and sound are the expression, while paper, screen, audio equipment and other material used to directly present words, images and sound are regarded as media.

Thirdly, in social semiotics, particularly in studies of multimodality, the concept of the medium is very broad, covering all kinds of meaning carriers. Moreover, studies of multimodality investigate the medium in terms of its semantic relationship with signs, but not its mechanical relationship, meaning that a multimodal view of the medium is related to the message receiver's meaning-making of the message under certain cultural and social construction (Kress and Van Leeuwen 1996, 2001, 2006), but multimodal researchers do not seem to have much interest yet in studying *separately* the previous step before meaning-making where signs are displayed and formed by the mechanical influence of the medium. In contrast, the concept of medium in this paper is narrowed down to the scope of storytelling instead of all kinds of meaning-making. Within this scope, what will be discussed is the mechanical layer of the storytelling mechanism, that is, the arrangement of signs and its relationship with the interpreter's action. Meaning carried by the signs or added by the medium to the signs will not be considered or discussed in this paper.

In fact, the closest concept of medium to the one used in this paper is from cybertext theory that focuses on "the mechanical organisation of the text [… while positing] the intricacies of the medium as an integral part of the literary exchange" (Aarseth 1997: 1). Similar to cybertext theory, this paper also discusses the medium in a mechanical perspective. However, "medium" used in this paper is considered as a physical agency of storytelling, while the cybertextual medium refers to a material component of the cybertext (21).

A typology of narrative texts

It is necessary to point out that from the perspective of mechanical textual behaviour, i.e. the arrangement of signs, many media may share the same mechanical textual behaviours. For example, films on the screen and paintings on the canvas are the same in terms of the principle of arranging signs. In films, the signs are dynamic, but the arrangement or the combination of these dynamic signs remains the same during every projection. Paintings have still signs, so the arrangement of signs stays the same every time they are displayed. This paper proposes to use the term *stable* to address this kind of mechanical textual behaviour, that is, the arrangement of signs (e.g. visual, verbal or tactile, dynamic or still) does not change compared with that from any other time when being *traversed* by any interpreter. "Traverse" is proposed in this paper to refer to the action of the interpreter to travel through the narrative content with necessary physical operations on it, or without any physical operations at all. Necessary physical operations include, but are not limited to, moving one's eyes or angles to examine art pieces, turning pages, swiping, tapping, blowing on the touchscreen, accomplishing physical tasks required by the textual machine in order to continue the traverse, etc.

The example of mechanical textual behaviours in films and paintings suggests that although the medium has significant influence on mechanical textual behaviour, different media can have the same mechanical textual behaviours, which indicates that the study of mechanical textual behaviour can actually be independent of the medium.

The subtle relationship between the medium and mechanical textual behaviour gives rise to an original typology of (children's) narrative texts where both digital and non-digital formats are considered. Such a typology is helpful in understanding how story apps work at a mechanical level, and whether such an app mechanism is revolutionary.

The author of this paper examined mechanical textual behaviours in different major stable media of storytelling, for example, a canvas and frame for narrative paintings, different materials for sculptures, paper in books with or without paper engineering, a screen for moving images such as TV programmes, films and

animations, and a computer (touch)screen for digital texts. Based on the mechanical textual behaviours on these media and their influence on the interpreter's action on the narrative content via the media, the author developed an original typology for major narrative texts both in and outside children's literature. By asking the following 11 questions about a narrative text, digital or non-digital, we can describe any narrative text according to their mechanical textual behaviours:

1. Is the medium[1] stable?
2. Are all the signs (e.g. visual, aural or tactile, dynamic or still) that are embedded in the text presented to the interpreter via the medium *during* the moment of the interpreter's traverse?
3. If the answer to question 2 is "yes", are all the signs embedded in the text presented to the interpreter via the medium with the *same arrangement* during different moments of the traverses?
4. If the answer to question 3 is "no", is the *variation* of the arrangement of the signs limited?
5. If the answer to question 2 is "no", do the unpresented signs need to be revealed by the physical operation of the interpreter on the medium?
6. If the answer to question 5 is "yes", does the physical operation involve "non-trivial efforts"[2] from the interpreter?
7. If the answer to question 5 is "yes", during one *complete traverse*[3] of the text, is it possible to reveal all the hidden signs by the physical operation of the ideal interpreter on the medium?
8. If the answer to question 7 is "yes", during one complete traverse of the text, is it possible to reveal all the hidden signs with the *same arrangement* by the physical operation of the ideal interpreter on the medium?
9. If the answer to question 8 is "no", is the *variation* of the arrangement of the signs limited?
10. If the answer to question 7 is "no", is the *arrangement* of the revealed signs on the medium the *same* during different traverses of the ideal interpreter?

[1] If more than one medium is used in storytelling, "the medium" here will refer to an integration of all the physical conduits used to directly present the narrative content. This concept applies to all 11 questions. If any one of the physical conduits is unstable, it makes the integral whole unstable. For example, in the case of a storyteller using a projection screen to tell stories, the medium as an integral whole includes the storyteller and the projection screen. Since the storyteller does not have consistent performance, and therefore is an unstable medium, although the projection screen is stable, the integral whole is considered unstable.

[2] "Non-trivial effort" is a term borrowed from cybertext theory. It means that when traversing the text, the interpreter needs to effectuate "a semiotic sequence". Such a movement is "selective" rather than "(for example) eye movement and the periodic or arbitrary turning of pages" (Aarseth 1997: 1–2). Selective page turning is considered in this paper as non-trivial.

[3] "Complete traverse" is used in this article to refer to the situation where the interpreter completes all necessary physical tasks (turning a page, tapping on a hotspot on the touchscreen, etc.) and travels through all the necessary parts of the text to have a complete experience of (one version of) the story.

11. If the answer to question 10 is "no", is the *variation* of the arrangement of the signs limited?

By answering "yes" or "no" to each question, we can give a position to any narrative text (not limited to texts for children) in the space of textuality. The position of a particular text may be a matter of debate, but this does not invalidate the presented typology. It is also worth pointing out that the typology is theoretical, and therefore it would not be surprising if one could not yet identify empirical equivalents for some theoretical categories, if there are any.

The application of the typology

Based on the typology, we may find that story apps are in the same positions as many other texts, digital or non-digital. For the purpose of demonstration and due to the constraint of the paper, the author will only use four positions (see Table 1) in the typology to elaborate how story apps can be approached based on their mechanical textual behaviours, and why such behaviours are not revolutionary. For this purpose, each demonstration will start with examples found in non-app storytelling, and then move to app storytelling to show the resemblance. The demonstrations are just examples of how the typology can be used to understand different textualities. The author does not intend to claim that the four text types in Table 1 are the only suitable positions to situate the texts used in the demonstrations, and neither does the author imply that the four positions are the only empirical ones in the typology. An exhaustive demonstration of all text types might be the subject of a later paper.

In Table 1, text type no. 1 (text position YN00YNYY000) is the type where the medium is stable, but there are signs not presented to the interpreter who needs to reveal the hidden signs by trivial efforts such as periodically and arbitrarily turning the (digital) page to reveal the signs on the next (digital) page. Such a type allows the interpreter to reveal all the signs within a single time of a complete traverse. During different traverses, the signs presented and revealed are with the same arrangement. This position suits some story apps that do not contain extra interactive features other than page-turning hotspots. It also suits (for example) (picture)books without paper engineering[4] or those that do not offer nonlinear[5] reading experience, pop-ups, and some hyperfictions that allow readers to click on all the hyperlinks to finish reading the story.

[4] Paper engineering includes, but is not limited to, book sculptures, pop-up designs, flap design, books with loosely bound chapters that can be read in any order, such as the famous work by B.S. Johnson (1969), *The Unfortunates*.

[5] "Nonlinear" is used in this paper to describe the physical traversing experience where the interpreter cannot traverse the text sequentially due to the design of the original creator of the text.

Table 1. Selected text types based on the mechanical textual behaviour. "Y" is short for "yes" and "N" for "no". "0" means nil, not applicable.

Tablica 1. Odabrani tipovi tekstova na temelju mehaničkoga tekstnoga ponašanja. „Y" je kratica za „da" a „N" za „ne". „0" znači nula, tj. nije primjenjivo.

QUESTIONS	TEXT POSITIONS			
	1	2	3	4
1. Is the medium stable?	Y	Y	Y	Y
2. Are all the signs (e.g. visual, aural or tactile, dynamic or still) that are embedded in the text presented to the interpreter via the medium *during* the moment of the interpreter's traverse?	N	N	N	N
3. If the answer to question 2 is "yes", are all the signs embedded in the text presented to the interpreter via the medium with the same arrangement during different moments of the traverses?	0	0	0	0
4. If the answer to question 3 is "no", is the variation of the arrangement of the signs limited?	0	0	0	0
5. If the answer to question 2 is "no", do the unpresented signs need to be revealed by the physical operation of the interpreter on the medium?	Y	Y	Y	Y
6. If the answer to question 5 is "yes", does the physical operation involve "non-trivial efforts" from the interpreter?	N	Y	Y	Y
7. If the answer to question 5 is "yes", during one complete traverse of the text, is it possible to reveal all the hidden signs by the physical operation of the ideal interpreter on the medium?	Y	Y	Y	N
8. If the answer to question 7 is "yes", during one complete traverse of the text, is it possible to reveal all the hidden signs with the same arrangement by the physical operation of the ideal interpreter on the medium?	Y	Y	N	0
9. If the answer to question 8 is "no", is the variation of the arrangement of the signs limited?	0	0	Y	0
10. If the answer to question 7 is "no", is the arrangement of the revealed signs on the medium the same during different traverses of the ideal interpreter?	0	0	0	N
11. If the answer to question 10 is "no", is the variation of the arrangement of the signs limited?	0	0	0	Y

Specifically, for a (picture)book without paper engineering or for those that do not offer nonlinear reading experience, the arrangement of signs, no matter how carefully designed, is fixed on every page. As all the pages of the (picture)book cannot be seen at the same time, it is thus considered that when interpreters are reading signs from one page, they are not presented with the signs from the next pages. By turning the page, they reveal some signs that are "hidden" from them. As (picture)books without paper engineering are designed linearly with one page following the other, it is thus possible for interpreters to reveal all the hidden signs in one reading, and all the signs are positioned the same during different readings.

For pop-ups with only immediate pop-up designs, the interpreter reveals the pop-up features at the same time as opening the book or turning a page. Therefore, all the hidden signs can be revealed in pop-ups. Turning a page and revealing the pop-up features are simultaneous, so the interpreter's physical action on the books is not considered selective movement and therefore is a trivial effort, unless the page-turning is not an arbitrary movement (which will be a non-trivial effort). The arrangement of signs in pop-ups is considered stable because the pop-up features are fixed on the pages. It is debatable, though, whether for pop-ups the arrangement of signs is the same during different readings. If we consider only the ideal situation where every time a pop-up is revealed, it pops up with the same dimension, we can say that the arrangement of signs is the same during different readings; otherwise, the arrangement of signs is different. Depending on the possible variations of the dimension of a pop-up, such pop-ups can have limited or unlimited variations of the arrangement of signs.

For some hyperfictions that require interpreters to click on all the hyperlinks to finish their reading, on each "page" of the hyperfiction, whether there is sound or moving images, the arrangement of the signs, still or dynamic, is unchanged because the travel routes of the dynamic signs are the same as at any other time when being traversed. Clicking on a hyperlink is similar to turning a page. However, depending on the design of the hyperfiction, clicking on a hyperlink can be a non-selective movement but can also be a selective one when readers need to make a decision on which link to click first on the same "page". No matter which design it is, as long as the hyperfiction requires the interpreter to click on all the hyperlinks to finish traversing the text, all the hidden signs will be revealed by the interpreter with the same arrangement of the signs.

As for some story apps containing no interactive features other than hotspots for page-turning, the principle of arranging signs is the same as that in the hyperfictions discussed above. In these story apps, tapping or swiping on the touchscreen to turn to the next scene is very similar to clicking on a hyperlink or turning an actual page.

This type of story app is not currently a mass product for children in app stores as it is not highly interactive and is therefore considered unprofitable.

Text type no. 2 (text position YN00YYYY000) in Table 1 is similar to text type no. 1 except that such a text type requires non-trivial efforts from the interpreter to reveal all the hidden signs. Story apps that can be situated in this position are those whose signs have a fixed design in terms of their travel routes, ways of presentation, etc. Along with these story apps, one may also find the position suitable for books offering a nonlinear reading experience.

Some examples of books offering a nonlinear reading experience are *Landscape Painted with Tea* (Pavić 1992) and *Fighting Fantasy* (Livingstone and Jackson 1982) where the narrators sometimes direct readers to turn to specific pages during their reading or throw dice to choose their own adventures. In these cases, turning a page and throwing dice are not arbitrary movements, and therefore are non-trivial efforts. As they are printed books, the arrangement of signs on each page is fixed. Although the reading experience of these books can be nonlinear, in a single reading it is almost certain that the interpreter will reveal all the signs.

As for story apps in text type no. 2, an example is *Axel Scheffler's Flip Flap Farm* (version 1.0.3 2014), a story app developed by Nosy Crow. The idea of the app comes from lift-a-flap books which can also be situated in this text position. In the screenshot shown in Figure 2, the animal image is divided into an upper body tile and a lower body tile, and so are the words that have one tile containing the words in blue fill along with the paragraph next to them, and the other tile containing the rest of the words. All the tiles are replaceable with new tiles programmed into the app, but they can only be replaced by swiping one tile at a time on the touchscreen. Simultaneously, there is also a voice reading the new combination of words whenever it is formed. Although the tiles can be changed to form new combinations, the tile database is rather limited, and so are the combinations of signs. Therefore, it is arguable whether the interpreter can reveal all the signs during one complete traverse of the app. The arrangement of signs in this app remains the same during different traverses, as whenever the same signs appear they are placed exactly in the same position on the touchscreen, which is similar to the principle of the arrangement of signs in films. This type of app requires the interpreter to make a decision or choice in terms of which tile to swipe. Such an action is selective and thus is non-trivial (unless the interpreter swipes the tiles without a purpose). Similar story apps that can be situated in this text position are, for example, other flip flap apps from Nosy Crow (*Axel Scheffler's Flip Flap Jungle* (version 1.0) 2015; *Axel Scheffler's Flip Flap Safari* (version 1.0.1) 2014), *David Wiesner's Spot* (version 1.1 2015), and *Love, the App* (version 1.0.2 2014).

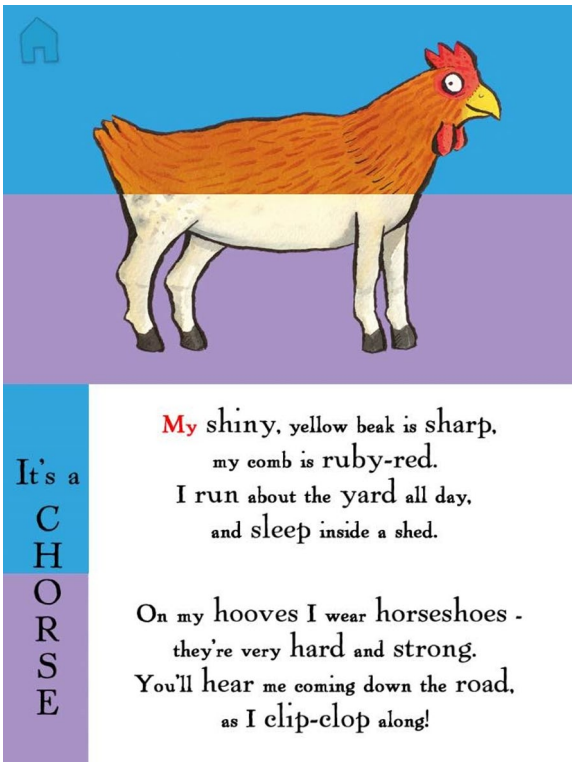

Fig. 2. A screenshot of the story app *Axel Scheffler's Flip Flap Farm* (version 1.0.3) developed by Nosy Crow.*
Sl. 2. Slika zaslona iz pripovjedne aplikacije *Axel Scheffler's Flip Flap Farm* (inačica 1.0.3), izrada Nosy Crow.

Text type no. 3 (position YN00YYYNY00) in Table 2 is the type where the medium is stable, the text requires non-trivial efforts from the interpreter to reveal all the hidden signs during one complete traverse of the text, and where the arrangement of signs varies during different traverses. However, the variation of the arrangement is limited. Story apps that can be placed in this position are those with an unfixed route/presentation design of signs. The position may also be suitable for some (picture)books involving particular physical operations from the interpreter.

One picturebook example is a French pop-up edition of *Le Petit Prince* (Saint-Exupéry 2009). Apart from pop-up designs, the book also has moveable features such as the one on page 35 where the interpreter is supposed to turn a paper turntable

* We are grateful to Nosy Crow in London for giving Yan Zheng permission to include the illustrations from *Alex Scheffler's Flip Flap Farm* to be published in both printed and electronic versions of this issue of *Libri & Liberi*.

Fig. 3. A screenshot of the story app *Pierrot Pierrette* (version 1.3.0) written and illustrated by Nicolas Gouny, and developed by Audois & Alleuil Editions.*
Sl. 3. Slika zaslona iz pripovjedne aplikacije *Pierrot Pierrette* (inačica 1.3.0), autor slika i teksta Nicolas Gouny, izrada Audois & Alleuil Editions.

to form a different arrangement of stars. In this case, the arrangement of signs is not stable due to the unpredictable turning style of the interpreter. By turning the turntable, the interpreter's operation is selective and therefore is a non-trivial effort. Another example is the pop-up book *Peter Pan* (Barrie 2015) illustrated by Minalima, where, for example on page 79 and page 151, the interpreter is encouraged to move the unfixed features on the pages to form new patterns of signs. Consequently, the unstable sign "movements" on the pages cause an unstable arrangement of signs. However, as the choices for moving the unfixed features are limited, the variation of the arrangement of signs revealed on the page is limited.

There are many story apps that do not have a stable arrangement of signs, yet it is possible for the ideal interpreter to reveal all the hidden signs during one complete traverse of the text. These story apps contain hotspots for the interpreter to discover

* We are grateful to Nicolas Gouny and Audois & Alleuil Editions in France for giving Yan Zheng permission to include the picture from *Pierrot Pierrette* in her paper to be published in both printed and electronic versions of this issue of *Libri & Liberi*.

and to interact with. Interacting with hotspots is considered as a non-trivial effort. One example of such an app is *Pierrot Pierrette* (version 1.3.0 2015) developed by Audois & Alleuil Editions. There is a scene in the app (see Figure 3) where Pierrette is ill in bed and Pierrot is by her side weeping. All the stars in this scene can be moved by the gesture of dragging. To emphasise a sense of sadness and despair, the interpreter can make some or all the stars disappear from the sky by dragging them to any blackness shown in the scene (e.g. the moon, the earth, the sheet, and the hair of the protagonists). As the selective movement of the interpreter is unpredictable, and the route design of the stars is not fixed, the arrangement of the stars will not be the same during different traverses of the app. As the scenes are sequentially presented, an ideal interpreter can reveal all the signs during one complete traverse. The variation of the arrangement of the stars can be considered limited as the stars can be placed only on the tablet screen, while the size of the screen is not infinite. In this sense, although we may have many more possibilities of variation than we may get from pop-up books in this text category, such possibilities are still limited. Similar story apps are, for example, *Lil' Red – An Interactive Story* (Main 2013), *The Fantastic Flying Books of Mr. Morris Lessmore* (version 1.4.5 2015), and *The Heart and the Bottle for iPad* (version 1.0 2010).

Finally, text type no. 4 (position YN00YYN00NY) describes the text that has a stable medium, but even with non-trivial efforts, the interpreter cannot reveal all the hidden signs in one complete traverse. The arrangement of the revealed signs on the medium may not be the same during different traverses, but the variation of the arrangements is limited. Existing examples are usually found in adventure computer games where the interpreter is required to make choices among many options to move forward in the story. The choices have causal effects, which means different choices may lead to a different development of the story. Once a choice is made, the interpreter will not know the other possibilities for the story's development following other choices unless he or she plays the game again and makes a different choice. This means even the ideal interpreter cannot possibly reveal all the hidden signs in the computer game within one complete traverse of the text. As for the arrangement of the revealed signs, it may not remain the same during different traverses because of the unfixed designed routes of each sign. However, in the case of computer games, it is arguable whether the variation of the arrangement of the signs is limited. This depends on what kind of programming model the game adopts. For example, if the model allows random user input, the variation will be unlimited since a player can input anything into the game in any order.

There are many story apps that have adopted the narrative strategies discussed above from computer games. For example, there is a scene in *The Ogress* (version

1.2.0 2014), developed by La souri qui raconte, where the interpreter needs to choose one out of three options to proceed with the story. Each option leads to a completely different development of the story and the interpreter will not be able to reveal all the versions of the story by traversing the app from the beginning to the end only once. Similar story apps are, for example, *Jack and the Beanstalk* (version 1.0.3 2014), *Little Red Riding Hood* (version 1.0.7 2014), *Wuwu & Co. – A Magical Picture Book* (version 1.3 2016), and *The Great Ghost Chase* (version 1.1.2 2014).

It is necessary to point out that text type no. 4 might not be exclusive to digital narrative texts. Non-digital ones can also be made out of the same mechanical textual behaviours. For example, if the interactive book mentioned in text type no. 3 also requires the interpreter to make choices during the traverse, and making the choices means that the interpreter will have to skip certain parts of the book since these parts do not belong to the development of the story that he or she picks, such a book will be qualified to take the position YN00YYN00NY.

Conclusions and implications

This paper started with the question whether app storytelling is different from other platforms of storytelling in terms of its mechanical textual behaviours. It began with the medium, but departed from the medium as it turned out that the discussion of mechanical textual behaviours can be independent of the medium, which gave rise to an original typology of children's narrative texts proposed in this paper. Based on this typology, it can be concluded that story apps on the market do not have unique mechanical textual behaviours. All the behaviours found in the story apps are evident on one or another platform of storytelling, which means that story apps have not brought any essential change to the mechanical layer of the storytelling mechanism, although they may have more complicated narrative patterns. However, this conclusion by no means suggests that the traversal experiences of the interpreter will be the same, as a multimodal approach demonstrates very well how different these experiences are. The finding indicates that it is not necessary to pay attention to the touchscreen when we study story apps, and furthermore children's narrative texts can be studied together irrespective of their media. The finding also reflects that it will be fruitful to take an interdisciplinary approach to understand how story apps tell stories, as the apps contain mechanical textual behaviours existing in various media. However, with this finding, the author makes no attempt to invalidate other approaches to story apps or other narrative texts, but hopes that this finding can provide a theoretical perspective that is adoptable for children's literature research on digital texts.

The typology developed in this paper is a broad perspective to describe different textualities from the angle of the mechanical layer of the storytelling mechanism, but it is not intended to be the only way to look at a text. It is developed based on the medium, takes firmly into account the affordances of the medium, but is also independent of the medium. As discussion of the medium has only included stable ones, the typology can be further explained with texts based on unstable media. Nevertheless, this typology may have some heuristic value for story creators to innovate ways of storytelling, and to explore the potentials of the affordances of different media. It also has a radical implication for children's literature research and education: it seems possible to develop a universal grammar for all types of textualities in terms of how they work mechanically, which may sound ambitious but is actually feasible. Such a grammar may help us understand the similarities of different media rather than the differences. For literacy education, this typology may be helpful in developing a literacy teaching method that is based on the essence of storytelling instead of the platform for it. Based on such a teaching method, it might be interesting to see what differences (if any) each type of text can have in terms of the cognitive process of children.

Finally, although story apps do not bring any new mechanical textual behaviour for the storytelling mechanism, the author of this paper believes that there are great potentials found in computer technology in terms of innovating ways of storytelling. What may happen in a few years' time to the narrative strategies of storytelling is highly unpredictable. It is because of this unpredictable feature of technology that the typology developed in this paper has significant value because, although it is still in its early stages, it does not seem to be restrained by the development of technology, while the study of children's digital literature still needs exploration, and needs models and theories of its own that can hopefully last in time.

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Donose li pripovjedne aplikacije što novo? Promišljanje o pripovjednim mehanizmima u različitim medijima

U radu se polazi od pitanja razlikuje li se u kontekstu dječje književnosti pripovijedanje s pomoću aplikacija od drugih načina pripovijedanja te se pripovjedne aplikacije istražuju u usporedbi s drugim pripovjednim platformama. Interdisciplinarnim se pristupom izgrađuje originalni model pripovjednih mehanizama te se na temelju njega razmatra mehanički pripovjedni sloj u različitim medijima. Predlaže se izvorna tipologija pripovjednoga teksta koja se sastoji od 64 tekstualna položaja. Uz pomoć četiriju odabranih tekstualnih položaja pokazuje se da su pripovjedne strategije uočene u pripovjednim aplikacijama razvidne i u drugim pripovjednim modusima. To otkriće upućuje na zaključak da, iako pri razmatranju pripovjednih aplikacija naglasak može biti na dodirnome ekranu i njegovim prednostima, nije nužno baviti se dodirnim ekranom želimo li razumjeti načine funkcioniranja pripovjednih aplikacija. Razlog je tomu taj što je ovakve dječje pripovijedi moguće istraživati i poučavati neovisno o mediju kojim se posreduju.

Ključne riječi: dječja književnost, interdisciplinarnost, mehaničko tekstualno ponašanje, medij, pripovjedne aplikacije, pripovjedni mehanizam, tipologija

Gibt's was Neues in Erzähl-Apps? Überlegungen zu Erzählmechanismen in unterschiedlichen Medien

Im Beitrag wird von der Frage ausgegangen, ob sich im Bereich der Kinder- und Jugendliteratur das Erzählen durch Apps von anderen Erzählformen unterscheidet. Anhand

einer interdisziplinären Zugangsweise wird ein originäres Modell von Erzählmechanismen entworfen, aufgrund dessen die mechanische Erzählschicht in unterschiedlichen Medien analysiert wird. Davon ausgehend wird eine originäre Typologie von Erzähltexten vorgeschlagen, die aus 64 Textpositionen besteht. Anhand vier ausgewählter Textpositionen wird demonstriert, dass die in den Erzähl-Apps festgestellten Erzählstrategien auch auf anderen Erzählplattformen enthalten sind. Daraus ist zu schließen, dass trotz der Tatsache, dass man in der Erforschung von Erzähl-Apps auch vom Tastbildschirm und seinen Vorteilen ausgehen könnte, so etwas nicht notwendig ist, um die Art und Weise, auf welche die Erzähl-Apps funktionieren, zu verstehen. Der Grund dafür liegt darin, dass man solche kinder- und jugendorientierte Erzählformen unabhängig vom Medium, in dem sie vermittelt werden, erforschen kann.

Schlüsselwörter: Kinder- und Jugendliteratur, Interdisziplinarität, mechanisches Textverhalten, Medien, Erzähl-Apps, Erzählmechanismus, Typologie