Digital Words of Wisdom? Milia (AppleTree), An Online Platform for Digital Storytelling

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ABSTRACT

This paper introduces Milia (AppleTree), an open online platform for social interactive digital storytelling, which has been developed by the Laboratory of New Technologies in Communication, Education and the Mass Media, with the support of the University Research Institute of Applied Communication (URIAC) of the Faculty of Communication and Media Studies of the University of Athens. The Milia platform aims to support the representation, presentation and collaborative creation of any sort of stories in digital format. Applications of the platform can be found in storytelling per se, in education, in publishing and, more generally, in the creation and publication of collaborative digital works. The first part of the paper is focused on a state of the art review for digital storytelling platforms and discussion of some major challenges that these platforms are attempting to face. This review is followed by a second part, which discusses the technical features and functional capabilities of the Milia platform in detail, and a third part, which reports on applications of the platform that have already been realized and digital stories that are already available online. The paper is concluded with a discussion of limitations and directions of future work for the Milia platform.

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1. Contextualization and objectives of the Milia development project in a landscape of non-linear digital storytelling

Digital storytelling, according to Wikipedia, “refers to a short form of digital media production that allows everyday people to share aspects of their life story.”6 Indeed, this statement incorporates an important part of the applications and scope that the practice of capturing, creating and telling stories with the use of digital media has taken up today. In all these applications that, beyond personal stories, encompass stories for entertainment, stories for advocacy, stories for advertising, stories for learning and many others, the way that storylines are structured (or, on the contrary, left less structured) makes heavy use of the capabilities of the digital medium, which once more, becomes itself the message. One of the more distinctive capabilities of this digital medium, beyond its ability to simulate other media, from voice and writing to music and pictures, is its flexibility to present the same contents in completely different sequences. Using digital media, changing the way that a story is told from linear to non-linear is an absolutely practical option, which often seems (and actually is) more engaging that the traditional linear way of narrating. As a result, the landscape of stories told through digital media becomes more and more a landscape of non-linear narratives.7 In turn, the support of digital storytelling platforms for non-linearity is no longer an advanced option, but a basic requirement. This is especially true for new platforms for digital storytelling, such as the Milia platform discussed in this paper, which are conceived and designed in a digital environment where non-linear narratives (at least in the broader sense of hyperlinked digital content) already prevail.

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6 http://en.wikipedia.org/wiki/Digital_storytelling (last accessed on 06/12/2014)

7 Although this claim cannot be demonstrated through hard evidence, the emergence of non-linear narratives in digital media is definitely a trend, which seems to have the potential of becoming prevalent; as a testimony to this, cf. Wikipedia on the instances of non-linear narrative in video games (http://en.wikipedia.org/wiki/Nonlinear_narrative#Video_games, last accessed on 06/12/2014), which mentions that “... by creating a nonlinear storyline the complexity of game play is greatly expanded. Nonlinear game play allows for greater replay value, allowing the player to put together different pieces of a potentially puzzling storyline”, as well as (ibid.) on HTML narratives.
To be sure, users were to a non-negligible degree familiar with a non-linear context already long before the digital age, either in terms of having avidly read non-linear entertainment, like books at a first stage, or in terms of watching films with non-linear storytelling later on. The *in medias res* (in the middle of things) technique, where the story is related by way of flashbacks rather than in a chronological order is an example of what the audience has already been prepared for before the advent of digital media. 20th century films have been experimenting with non-linear stories using different techniques like parallel action (director Robert Altman), multiple points of view and no clear ending (cf. *Rashomon*, by Akira Kurosawa), or even different outcomes within the same movie (cf. *Run Lola Run*, by Tom Tykwer).

Nevertheless, the evolution of non-linear storytelling techniques has become much easier using an inherently non-linear medium like web 2.0 digital storytelling platforms. Web 2.0 stories are broad. They can represent history, fantasy, a presentation, a puzzle, a message. In this respect, narrativity is no more dependent on fictionality (Ryan, 2002). Current online tools for digital storytelling use open structures in order to help users create or launch stories. A major issue, in this effort, is how to design a platform that integrates the user's activity into a framework that respects the basic constitutional elements of narrative, namely people facing a challenge, trying to overcome it through a sequence of events and reaching a resolution (Ryan, 2002). Still, even if storytelling in general, under the influence of digital media, is to move towards a non-linear model, such a trend does not imply that this sort of narrative coherence is to be left out of the equation.

Narratives flow through games, platforms and other digital tools widely accessible via the internet, whereas at the same time listening to and reading stories moves forward from a static activity to an interactive, dynamic process where the lines between the author and the audience blur. In this context, an attempt to deploy an open platform for communication reaching modern storytellers is that of Milia (AppleTree), an open online platform for social interactive digital storytelling. The Milia platform ([http://www.media.uoa.gr/ntlab/milia](http://www.media.uoa.gr/ntlab/milia)) has been developed by the Laboratory of New Technologies in Communication, Education and the Mass Media ([http://www.media.uoa.gr/ntlab](http://www.media.uoa.gr/ntlab)), with the support of the University Research Institute of Applied Communication (URIAC) of the Faculty of Communication and Media Studies of the University of Athens.

The core ideas that underlie the conception of this platform are to provide users with the ability for personal creation and social sharing of stories, together with the opportunity for experimenting with the possibilities of the branching structure of the platform in non-linear stories. Integrating creation and reading of stories in a non-linear way, the user of the Milia platform is in a sense meant to be at the same time a reader and a creator, as (s)he imports personal data and also reads the stories of others. One more
design objective of the platform is to be flexible and powerful enough so as to support the representation, presentation and collaborative creation of any sort of stories in digital format, with intended applications in storytelling per se, in education, in publishing and, more generally, in the creation and publication of collaborative digital works. The vision behind development of the Milia platform has been that of being able to offer to everyone interested the means to “plant” a story and see it grow up into a fruitful tree, and thus provide an online space where creators can make stories by planting their own trees, in publicly accessible “digital fields” or in their own, private, “digital gardens”. In this way the Milia platform is meant to enable the creation of a data bank of interactive stories, which readers will have the capability to extend and enrich with their own ideas and alternative versions, and thus offer itself as a new instrument at the service of free expression, knowledge and creativity.

Milia is at the same time meant to serve as a useful educational tool. Students should be able to use it, for instance, to create their own stories or read and amend the stories of their classmates, thus having the opportunity to practice and develop their language skills (grammar, syntax, vocabulary, expression), to become familiar with the art of story making and storytelling, to learn and appreciate the teamwork that will be necessary for creating and uploading their stories, and at the same time profit from hands-on experience with computers, the internet and interactive multimedia applications.

Last but not least, apart from its educational and creative aspects, Milia is also intended to offer itself as a medium for preserving stories and narratives from the past, thus safeguarding the collective creations and memories of a community. The above challenges, objectives and ambitions that have guided the conception and design of the Milia platform can be considered, in a sense, to comprise a gap in digital storytelling research and applications that this platform is intended to address.

Figure 1 presents a representative welcome screen from the Milia online platform. Every apple tree holds a story, and the tree elements represent the story’s structure and contents. Figure 2 presents a representative snapshot of Milia tree elements, storing images and other multimedia content. All these elements can be uploaded and edited online through a graphical interface that allows users of the platform to operate as story creators. A sample screen from the Milia GUI is presented in Figure 3.
2. An overview of digital storytelling platforms

A digital storytelling platform in general is supposed to fulfil three basic principles: Collect data, edit and export a story. The difference is the level of freedom that such a platform offers to users. The Milia platform, as mentioned above, aims to support the representation, presentation and collaborative creation of any sort of stories in digital format. A story seen in Milia is interweaving different media to support a central idea. Users are linking and orchestrating different clues to build a meaning for the reader. Since readers and users co-exist in this digital storytelling platform it is essential for their creations to find their way to the audience in a non-linear yet coherent way.
Figure 3. Sample screen from the online interface of the Milia platform for uploading and editing story elements.

Other digital storytelling platforms that share the same principles of presenting a story are briefly overviewed in the following. For this overview, which has been intentionally designed as a selective rather than an exhaustive one, a small number of platforms has been chosen of which each one is different from Milia in terms of features and functionality, yet similar in terms of philosophy and overarching goals, offering at varying degrees of support capabilities for (a) branching narrative structures, (b) social sharing of stories, as well as (c) the organization of personal data in a new and compelling way.

Still, given the current interest in digital storytelling and the proliferation of relevant applications, it is worth noting that there are many more storytelling platforms and tools that the interested reader could explore, and which have not been selected using the criteria above. A Pinterest topic on storytelling platforms, for instance, lists more than 25 such platforms⁸, whereas educational technology sites provide many pointers to tools that can be used for making stories based on user-generated content, and/or mashed-up content available online, and/or predefined primitives and templates⁹.

2.1 Pearltrees

Pearltrees (http://www.pearltrees.com/) is a visual and collaborative content curation tool that allows users to collect, organize and share URLs. Users can drag and organize

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⁸ webpage https://www.pinterest.com/plotlines/storytelling-platforms/ (last accessed on 05/12/2014)
⁹ for instance, webpage http://elearningindustry.com/free-digital-storytelling-tools-for-teachers-and-students (last accessed on 05/12/2014)
collected URLs into units called pearls. Pearltrees users can synchronise their social accounts with popular social networks such as Twitter and Facebook. A pearl represents a link to a web page; yet at the same time it is more than that, operating as an interactive object that users can move around their visual map. Users can share a pearl with others who “pearled” the same content and discuss it. What is especially intriguing is that users can view other users’ Pearltrees, which they can expand and explore at will. Pearltrees give meaning to the users’ interests and help to structure their web explorations. The tree structure helps by preserving a main theme of interests for each tree, whereas its branches can underline the sense of continuity with other similar themes.

2.2 My Heritage
My Heritage (http://www.myheritage.com/) is a family-oriented social network service and genealogy website. It allows logged-in users to digitally create their own family tree websites. In this way, the traditional family tree can turn into an interactive experience where family members share pictures and videos, organise family events, create new family trees and search for their ancestors. The My Heritage platform has become quite popular, reaching some 72 million users, and it is currently one of the largest sites in the social networking and genealogy field. One of its most distinctive features is the capability to search for family history through facial-recognition technology.

The visual experience of the tree scheme on the MyHeritage platform can in a sense be considered to represent a family story, which connects with other family stories. This scheme of presenting a story is used in other platforms as well, along with other types of structures like boxes, cubes as well as pin boards.

![Figure 4. Snapshot of the Pearltrees platform.](image-url)
2.3 Digital Vaults
The Digital Vaults website (http://www.digitalvaults.org/) represents more than a digital display of photos, documents, videos and archives. It essentially provides a reading experience in a non-linear way while at the same time, similar to other digital platforms, it offers users the possibility of creating their own collections, games, posters and movies with the database material of the National Archives. Visual materials of the National Archives collections are displayed to users, and the interaction of the latter with information records enables new material coming forward, in this way implementing a surprising, informative and important form of storytelling. The Digital Vaults user experience is strongly reminiscent of the views of researchers like Michael Joyce (excerpt italicized for emphasis): “Narration takes place in the mind of the viewer, as an interpretation of the connections he makes throughout his digital storytelling experience” (Joyce, 1995). Each image contains historical information that can be added as captions. The movie-making tool includes soundtrack options as well as basic editing facilities. With a free login account, users can save their work, share it via hyperlinks or e-mail their projects. Web 2.0 technology allows users to search the database both by keywords and tags. Users can browse through the hundreds of photographs, documents and film clips and discover the connection between some of the National Archives’ most treasured records. Digital Vaults represents an example of a constantly changing customary pattern of narration as stories are presented in an open-ended, branching, hyperlinked, cross-media, participatory, exploratory and unpredictable way (Alexander and Levine, 2008).

2.4 Museum Box
Museum Box (http://museumbox.e2bn.org/) is a tool for virtual displays of artifacts that someone can use online. Museum Box can help building up an argument or describing an
event, person or historical period by placing items in a virtual box. Users can put on display text, files and movies, and the boxes created can be commented on by the other users. The choice between 3-dimensional cubes and 2-dimensional images allows users to change the viewers’ perception within a story.

![Image](image1.png)

**Figure 6.** Snapshot of the Digital Vaults platform.

![Image](image2.png)

**Figure 7.** Snapshot of the Museum Box platform.

### 2.5 History Pin
History Pin ([http://www.historypin.com/](http://www.historypin.com/)) is an online user-generated archive of historical photos, videos, audio recordings and personal recollections. Using locations and dating the content allows users to “pin” it onto Google Maps. Where Google Street View is available, users can overlay historical photographs and compare them with the
contemporary location. In this way, History Pin has the potential of turning Google Maps into a worldwide, communal, open-air “memory place”. It should be noted that the method of loci (a way of memorising things by visualising them in locations) is quite effective for many people.

Figure 8. Snapshot of the History Pin platform.

2.6 Mr. Beller’s Neighborhood
Creating stories by viewing a map or a photo of a place motivates people to share their memory of this place. In this line of thought, Mr. Beller’s Neighborhood platform (http://mrbellersneighborhood.com/map) began publishing during spring 2000 and has so far published over a thousand pieces of original writing. This site combines the approach of a magazine with that of a map. It effectively uses the external, familiar landscape of New York City as a way of organising the internal, often unfamiliar, emotional landscapes of city dwellers.

Mr. Beller’s Neighborhood website publishes reportage, personal essays as well as urban sketches. For the first five or so years of its operation, the front page of the site was based on a satellite photograph of a map of Manhattan and parts of Brooklyn that was divided into sections, each representing a neighborhood. Clicking on one of these sections allows users to zoom into the corresponding neighborhood, with red dots linking to articles about the location. In 2005, the platform started using Google Maps in colour, which can be zoomed into and out of more easily and is generally more flexible and user-friendly.
2.7 Folding Story
Creating a digital story with strong interactive elements sometimes necessitates tools that are free (or, from another perspective, void) of scheme, with no specific graphical environment and offer users the freedom to upload the material and to decide on the way that it is going to be displayed. Folding Story (http://foldingstory.com/) is such a platform. It functions as a group storytelling game where players write one line of a story, fold the paper, and pass it on to the next player. It is a digital version of the classic classroom collaboration story game, in which participants take turns to add the next line to a story until the whole story is complete. However, each player can only see the last couple of lines, and hence can have no idea about how the story has been going before that point. This activity takes place on the Folding Story platform and users can read finished stories (fold stories) or participate in unfinished ones.
3. Features and capabilities of the Milia platform

Milia (AppleTree) is an open platform for social interactive digital storytelling. Its implementation is based on the Spiral Model (Boehm, 1986), a software development process combining elements of both design and prototyping in stages. Milia consists of two main subsystems: the Storytelling Viewer (Figure 11) where internet users may view posted stories (named AppleTree stories) and the Storytelling Editor where authenticated users create AppleTree stories (Figure 12).

![Figure 11. Storytelling Viewer interface of the Milia Platform.](image1)

![Figure 12. Storytelling Editor interface of the Milia Platform.](image2)

The Milia platform uses an apple tree as the space where story elements are placed. Elements can be of any media type (such as images, videos, sounds), but also text and hyperlinks. For every story element there is a corresponding tree element icon hanging from the apple tree as an apple, leaf or flower. Any combination is possible. For example, an AppleTree story may consist of sound leaves, image apples, text flowers etc. When a user clicks on a tree-element icon, the element expands and reveals the hidden content (Figure 13). Every element has control buttons in order to be moved, closed, zoomed in and zoomed out.
The free placement of story elements on a tree, in contrast to the common practice of using book pages or storyboards, offers the ability to access the story content in any order, in a non-linear way. Milia also supports linear storytelling, using the tree element description (Figure 14), a metadata text field where a story writer may give a short description for the tree-element, and/or define its sequence in the story.

In order to become a storywriter, a user should register in the corresponding webpage of the Milia online platform. From the corresponding welcome screen (Figure 15), a writer may create new AppleTree stories, and also enable (making publicly visible), edit, delete or disable (making hidden from public view) existing ones.
When creating a new story, a writer fills in mandatory fields Title and Description, whose values are stored in The Milia Database and can be altered at any time. These metadata can be used for advanced searching. Loading elements includes picking a spot from 50 predefined spots on the AppleTree structure, choosing an element type from Text, Image, Sound, Video, Hyperlink, and selecting a media type and a media file. Element types are subject to format, encoding and size limitations. Text files, for instance, need to be uploaded in .txt format, UTF-8 encoding and with a size limited to 100KB. At the same time, there is also a limitation of 50 elements and a total content size of 50MB per AppleTree story.

The “Edit Appletree Story” screen (Figure 16) displays a detailed view of the uploaded content of a story. From there, a writer may add or change the element description, change element type (from apple to leaf, for example), enable or disable an element from being displayed on the AppleTree, delete the element or preview it.
Last but not least, in order for Milia to be accessible to a wide range of audiences, care has been taken to comply to the Web Content Accessibility Guidelines 2.0 (WCAG 2.0) provided by the World Wide Web Consortium (W3C 2008). Examples include the presentation of non-text content of the Milia interface with text alternatives, audio control, resize text facilities, keyboard shortcuts for all functionalities and other similar features.

A more detailed description of the Milia features and functionalities can be found on the platform’s website, which is also available in English.\textsuperscript{10}

4. Educational projects using the Milia platform

The potential applications of the Milia platform can be found in storytelling per se, in education, in publishing and, more generally, in the publication of collaborative digital works.

Particularly in the domain of education, constructionists underline that young users can benefit from systems that are open-ended and support creativity and self-expression given that children (and adults, we may add), “learn by making” (Harel and Papert, 1991). Milia, as an online digital space for interactive storytelling, can also serve – among other

\textsuperscript{10} http://www2.media.uoa.gr/medialab/milia/index.php?lang=en
functions – as a useful educational tool. Schoolchildren can use it, for example, to create their own stories or read and process their classmates’ stories. As simple as they may seem, however, such activities can have important learning implications and outcomes:

a. A storymaking activity provides a way to practice and develop language skills (grammar and syntax), become familiar with the art of mythmaking and narration, as well as an opportunity to learn and appreciate teamwork, given that students are required to work in teams in order to invent and upload their stories.

b. At the same time, students can profit from hands-on experience with computers, the internet and multimedia applications.

c. Last but not least, students, like adults, can best learn the basic structure of a story by creating one, as well as learn how to present a subject by organising the main and secondary ideas around it upon the branches of a tree.

Along these lines of thinking, a number of educational interventions in formal school settings using the Milia platform have already been organised in collaboration with the authors. As of June 2013, Milia hosts some 50 stories mostly created by students of primary and secondary education. The stories present a variety of narrative formats, ranging from simple linear stories like fairy tales to more open-ended stories with non-linear structure.

In the following sections, three representative stories selected from those that have been deployed within educational interventions based on the Milia platform are briefly presented.

4.1 Story #1: Miliada

“Miliada” (Figure 17) is a story created by a group of 12 adolescent students named “cinephiles”. All group members are high-school students of the 9th High School of Athens, Greece, and the group collaborated outside the formal schooling hours. Group meetings were held at the computer lab of the school where there was just one computer accessible to students and connected to the internet.

“Miliada” is not a traditional fiction-based story with a beginning and an ending, but rather a narration that a user can read choosing his own path through the branches of the tree. It essentially represents a quest to search for the presence and symbolism of the apple in every aspect of human life through the years. The story reader departs from *The Judgement of Paris*, the famous 17th century painting of Rubens, and must choose, undertaking the role of the mythical Paris, a goddess to follow from Athena, Hera and Venus. The image of each goddess is an active hyperlink that leads to another story tree, therefore to a different way to explore the story. In fact Athena leads to the apple tree of archetypal myths; Hera to the apple tree of everyday life; and Venus to the apple tree of art and illustrations myths.
During this project, students claimed in the context of semi-structured group discussions that they enjoyed working together and were anxious to reveal all the secrets of their AppleTree story; nevertheless they felt tired near the end. Despite the practical difficulties faced during implementation of the project, with minimal resources and time, the students participating achieved a playful discovery experience, and in fact learnt about the stories and the connection between the three goddesses. In this case, using the Milia platform and digital storytelling led to turning material which was already taught into a departure point for an interactive experience of creativity and learning.

**Figure 17.** Snapshot from the Miliada story.

### 4.2 Story #2: Get Into the Museum

One more interactive non-linear story that has been developed by students on the Milia platform is “Get Into the Museum” (Figure 18). This story, developed by students of the 3rd grade in the 57th Primary School of Athens, is a narration that has come out of their visit to the National Archaeological Museum of Athens, the exhibits they had the opportunity to see, and their feelings and observations of this experience.

The sequence of story elements is completely open for the user to navigate, browsing the corresponding apple tree through apples, leaves or flowers. An important outcome of this project, beyond end results, lies in the educational process itself, since in order to develop their online story students effectively employed different digital media, including a camera, a computer as well as digital games. These were at the same time combined with conventional handwritten notes and drawings, reinforcing the view that storytelling is an inherently transmedial\(^{11}\) activity.\(^{12}\)

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\(^{11}\) as this term is proposed in the relevant literature, cf. for instance Leavenworth (2011), Ryan (2013)
During the visit to the museum students took handwritten notes, drew sketches of the exhibits and had the opportunity to touch, feel and observe them. In the class, students collected all their materials and evaluated which photos, drawings, texts and voice recordings would be posted on the Milia platform, together with some digital games they selected online (in which case, the corresponding URLs were uploaded on story elements).

As students were not familiar with the use of the story editing tools of the Milia platform, educators undertook the role of facilitating students’ work with the platform, leaving to students the initiative to decide upon the placement of their materials onto the tree structure of their apple story.

### 4.3 Story #3: The Magic Apple Tree

One more story that can serve as an example of what can be accomplished within a formal education setting with the Milia platform is “The Magic Apple Tree”. This third story is a more traditionally structured fairytale about a magic village of apple trees and a big dragon. The story was written for the 1st grade pupils of the 2nd Primary School of the Ano Liossia area, a low socio-economic status suburb region of Athens. The class consisted of 20 pupils with difficulty in Greek language due to their non-Greek (mostly Roma) origin.

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12 cf. for instance the definition of a narrative in Wikipedia, based on the corresponding lemma of the Oxford English Dictionary: “A narrative (or story) is any report of connected events, presented in a sequence of written or spoken words, and/or in a sequence of (moving) pictures.” (source: http://en.wikipedia.org/wiki/Narrative, last accessed on 05/12/2014)
During this project, students were triggered by a mystery letter from the people of Apple Village, asking the students to help them find the secret recipe of an apple pie that they wanted to cook for the sad dragon of the village. The students played treasure hunt games to find the recipe ingredients, and subsequently cooked and tasted the apple pie.

Through this educational scenario children having poor oral speech competencies were effectively encouraged to participate in organised activities of narration, as well as in informal hands-on activities like preparing an apple pie. The Milia platform was used in this case as a tool for introducing the activity and gaining the interest and enthusiasm of students.

Videos, photos and details from implementation of this project are uploaded as a narration in the Milia platform. It is important to note that, in this case, although students remained readers (rather than creators) of a story, educators managed to use the Milia platform as a means for presenting educational material in a much more attractive and playful way (Figure 19).

![Figure 19. Snapshot from the “Magic Apple Tree” story.](image-url)

The educational projects briefly described above are in line with the conclusion that digital storytelling has emerged over the last few years as a powerful teaching and learning tool, with the potential to engage both teachers and students. The Milia platform aims to capitalise on this potential, supporting the presentation and collaborative creation of any sort of narrative and stories in digital format, in a way that makes it free and accessible for every user to “plant” his/her own story.

5. Limitations and directions of future work for the Milia platform
The Milia platform is a project of the Laboratory of New Technologies in Communication, Education and the Mass Media of the University of Athens, launched in March 2010. The first pilot version of Milia was a stand-alone flash application where writers, in order to create new stories, had to manually embed story elements inside the application, something that needed programming skills. This prototypical implementation served to prove the concept of the platform and gain support and interest around it. At the same time, it necessitated creating a different software application per story, and it did not facilitate reaching a wider audience that can best be found online. Additional practical problems had to do with the fact that story element files (videos, sounds, text, images) had to be locally stored in the writers’ computers and named according to specific conventions, making it impractical to talk about portability.

The current version of Milia is an online application, based on the Flash and PhP environments for application development and the Joomla content management system, which enables writers to create stories within a user-friendly environment. Element files are stored centrally on the Milia server and metadata are automatically generated, organised and stored in the Milia Database for future use. This development is the result of a good initial design of the platform, coupled with a great amount of hard work and persistence from the members of the Milia project team. Although a lot has been achieved, there is still a lot that can done in the future. Many new ideas are being discussed for a future version of the Milia platform, and some of these ideas are presented below.

For a linear story to be created with the current version of Milia platform, AppleTree storywriters can number story elements to define the sequence of content, and visitors need to search the elements one by one to find out the predefined sequence. The same description field can be used to create a story with a different structure, for example a nodal story, where an AppleTree element may point to different elements, depending on a viewer’s choice (Figure 20).
In a future version, the Milia platform could respond dynamically to viewer’s choices. For example, in a linear story, only the first story element would be visible. When a visitor previews it that would trigger the appearance of the next element and so on. On top of that, in a nodal story there could be branching points (Figure 21a) where different paths could be proposed (Figure 21b) and the visitor could then decide which one to follow: by clicking the flower element, (Figure 21c) the flower path would be automatically revealed or by clicking the leaf element, (Figure 21d) the leaf path would be revealed.

The current AppleTree story creation procedure is based on an authentication schema, where writers create and post stories and visitors preview them. In a future version visitors could participate more actively in the formation of a story, being allowed capabilities to move a story element to a different place as well as hide/unhide it. Additionally, visitors, as well as writers, could be enabled to create new branches, add their own elements to a preexisting AppleTree story and save the resulting AppleTree stories locally to their computers. An appropriate stored data encoding of those personalised stories could allow to load them back to the Milia platform and make them visible for public view.
Another useful addition could be the integration into Milia of all the utilities that a writer may need in order to directly produce the content of story elements, such as for example a drawing application, a text editor, or a sound recorder. This could be helpful to writers with limited experience in managing files, such as elderly people or school students, by making it simpler for them to create new content for a story element (rather than being limited to upload already existing media files) and save it directly into the Milia platform.

Another improvement could be the use of a soundtrack per AppleTree story. A song or music track could act as a background companion for an entire story, offering to visitors an enriched experience. Writers could add a soundtrack to their stories through a procedure similar to uploading a sound element, whereas visitors could use a sound control toolbar (Figure 22) to play, pause, stop, increase/decrease volume or mute the soundtrack.

As the number of posted AppleTree stories grows (as of the time of writing, the Milia platform hosts more than 70 stories) there is the need for categorisation. Different levels of categorization can be envisaged, based on areas of interest (such as education, environment, culture), age range or socio-cultural profile of the audience that a story is addressed to (such as subcategories for Preschool, Primary School, Secondary School and Tertiary Education under a category for education). Writers could set the category of a story from the “New Appletree Story” screen (Figure 23) and metadata could be automatically generated, allowing visitors to filter available AppleTree stories per categories, using similar drop-down lists.
Moreover, another way to filter the increasing number of AppleTree stories would be to incorporate an advanced search engine into the Milia platform. Visitors would be able to search for a story using keywords. Searching could be based on current stored Milia metadata (story description, story elements description and filenames, etc) as well as on metadata from future extensions (e.g. story categorisation).

One more feature, which would add feedback capabilities to the Milia platform could be the addition of an open forum per AppleTree story, where visitors would post comments.
or suggest improvements for a specific story. This way, writers would be able to see the impact of their story to the public and proceed to necessary adjustments.

On top of that, in light of the current developments in online social media and online social networks, it is clear that the Milia platform lends itself to a number of social extensions which include:

(a) extensions with facilities for content-centered social actions, namely facilities to like and comment AppleTree stories, as well as share these stories in social media such as Facebook, Twitter and many others

(b) extensions with facilities for user-centered social actions, namely facilities to follow AppleTree story creators as well as subscribe to AppleTree story channels.

These extensions are quite straightforward to propose, as they rely on concepts which have now been established and operationalized in major social media popular nowadays while, at the same time, they also fit nicely with the overall functional logic of the Milia online platform. What is more, the development of such social mechanisms has the potential to boost the social dimensions of the way in which the Milia platform is used, thus pushing forward its design ambitions to operate as a platform for social storytelling. Implementation of these extensions, on the other side, has a number of subtleties which range from technical issues (integrating the Milia platform with social media APIs) all the way to operational challenges (for instance, up-scaling the Milia server capacity as required for managing large numbers of users and workloads), and will thus require careful technical design decisions and a well-planned development approach.

Still, despite their demands in implementation effort, these and other similar extensions can be expected to help the Milia platform proceed closer to fulfilling its overarching objective, that is, to offer an open, online, social, interactive space where writers can create stories and readers can have the opportunity to extend and enrich alternative versions of these stories using their own ideas.

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References

Alexander, B. and Levine, A. (2008) “Storytelling emergence of a new genre”, Educause Review, November-December, pp. 40-56.

Boehm W.B. (1986) “A Spiral Model of Software Development and Enhancement”, ACM SIGSOFT Software Engineering Notes, vol. 11, no. 4, August, pp. 14 – 24.

Harel, I. and Papert, S. (1991) Constructionism. Norwood, NJ, Ablex.

Joyce, M. (1995) Of Two Minds: Hypertext, Pedagogy, and Poetics. Ann Arbor: University of Michigan Press.

Leavenworth, M.L. (2011) “Transmedial Texts and Serialized Narratives”. In Textual Echoes, edited by Cyber Echoes, special issue on Transformative Works and Cultures, no. 8. doi:10.3983/twc.2011.0361.

Ryan, M.L. (2002) “Beyond the Myth and Metaphor: Narrative in Digital Media”, Poetics Today, vol. 23, no. 4, pp. 581-609.

Ryan, M.L. (2013) “Transmedial Storytelling and Transfictionality”, Poetics Today, vol. 34, no. 3, pp. 361-388.

W3C. (2008). Web Content Accessibility Guidelines (WCAG) 2.0. Online available at http://www.w3.org/TR/WCAG20, last accessed 2014-10-30.