Storix:
Embedding Digital Stories
in Time and Space

Masters thesis

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Abstract

Keywords: Storix, Augmented story, Digital story, Time, Location, Timeline, Map, Mash-up, AJAX, Web 2.0.

This thesis investigates the potential of digital stories that has been augmented with references to time and location. It looks into theory about stories and storytelling in general, both in a traditional and in a digital context. Based on this theory, proposals for usage and scenarios are presented, followed by a discussion of how a tool for experiencing augmented stories could be made. A proof-of-concept prototype has been implemented and is presented. Further, the thesis discusses findings from real life usage of the prototype by teachers and pupils in an educational setting. The thesis concludes that a web application for experiencing augmented stories can be created by using standard off-the-shelf software components, that augmented stories appear to be useful, and that education is an example of an area in which augmented stories seem to be of interest.

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Table of Contents

Chapter 1

Introduction

In May 2006, I travelled together with a group of people from the Mobile Applications Group[1] at Østfold University College[2] to Isle of Wight, England. The purpose of the trip was to contribute to the making of a digital map of Isle of Wight, together with the Open Street Map project[3]. This was done by driving around on the island with a GPS[4], saving our positions along the road. From these positions it was later possible to construct a map of the roads that we had driven.

In addition to making the map, we wanted to document our trip by using various software tools that have been developed at Østfold University College. Some of the tools used were from the Locus Times project, a collaborative real time journalism project. We wrote text, took pictures, and filmed. These data were later uploaded to a web page. By clicking links on the web page, a user could access this information together with information on location and time.

Some ideas started to emerge; what about making a tool that makes it easy for ordinary people to collect all their media from for example their vacation, and support them in storytelling on the Internet with visualization of time and location? A tool that allows viewers to easier take part of the experience? These ideas were the starting point for this thesis.

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[1] `http://mobapp.hiof.no/`
[2] `http://www.hiof.no/`
[3] `http://www.openstreetmap.org/`
[4] GPS stands for Global Positioning System. It is a system that gives you your exact position by using a handheld device utilizing 24 satellites orbiting the earth. The name is also used for the handheld device.

1.1   Research Objectives

Throughout the last few years, creating, consuming, and sharing digital content has become an everyday thing. We use social networking sites such as Facebook[5] and MySpace[6]. We share videos on YouTube[7] and write blogs about what we do and things we care about. We have digital cameras from which we upload images from vacations, parties, and other events that we want to share with others. We have elements that make it possible to create digital stories from our lives.

A digital story is the same as any other story. However, as it is digital, it allows support from various digital means; hyperlinks, images, video, and sound may be used. These devices allows for richer experiences than a book or an oral presentation. It provides us with new possibilities when presenting stories. Also, the digitization makes it easier for numerous people to collaborate when making a story, for example when a story takes place at different locations.

This thesis deals with enrichment of stories, particularly with focus on time and location. This will henceforth be called "augmented stories". The main objective of this thesis is to:

Investigate the potential of augmented stories

More specifically, the following questions will be addressed:

1. Is it possible to use standard off-the-shelf software components to build a web based narration tool for experiencing augmented stories?

2. In general, for the common user, are augmented stories useful?

3. Are there applications where augmented stories might be of particular use or interest?

1.2   Motivation

The use of digital content has increased dramatically during the last few years. Moreover, we see that the use of GPSes and digital maps is also on the rise, making it easier to combine content and location. One example of this is GeoTagging of images (see Figure 1.1), which allows users to find out where a picture has been taken. It can also be used the other way around to find pictures searching by location.

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[5] `http://www.facebook.com`
[6] `http://www.myspace.com`
[7] `http://www.youtube.com`
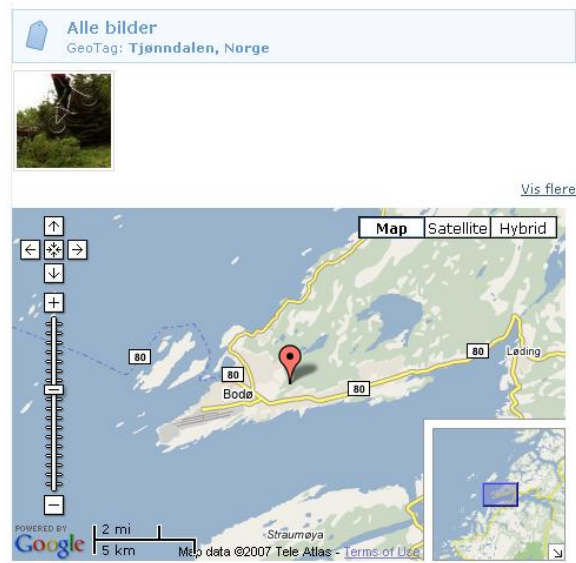
Figure 1.1: A GeoTagged image at the Blink (http://blink.dagbladet.no/) web site.

Just as something happens at a location, it also happens at a time. Awareness of time is crucial in organizing our lives; we use calendars and clocks to plan our future and to make reference to our past. However, use of time in storytelling usually limits itself to the chronological order of events.

Combining location and time in storytelling, enables users to tell and navigate stories in new ways. This will hopefully allow for a richer experience of the story.

1.3 Method

The concept described in this thesis was not clear from the beginning, thus an explorative approach was needed to identify what to make and how to make it. The process has been incremental and iterative: the concept has developed from it's theoretical foundations to a working prototype tested in a real life setting. The process has involved potential end users that have influenced the course.

The following steps have been made in the process of writing this thesis:

- Identification of research objectives
- Literature Studies
- Creation of a conceptual model
- Implementation of prototype
- Case Studies: bringing the prototype to real users to find out:

      – If they like the concept

      – What they can do with it

- Discussion of findings and future work

As the process has been incremental, each step builds on the previous steps in order to accumulate knowledge and understanding of the concept. The details of each step will be presented along the way.

1.4 Expected Deliverables and Research Contributions

The expected deliverables from this thesis are:

- A proof-of-concept implementation of storytelling software (Storix), which visualizes time and location in addition to using multimedia;
- A simple tool for adding and organizing content to be viewed in Storix.

The expected research contributions from this thesis are:

- Proposals for usage
- User experiences from storytelling with Storix
- A discussion of the viability of the concept and proposals for future work

1.5 Structure of Thesis

Chapter 2 contains the theoretical foundations for this thesis. Section 2.1 examines what stories are, both non-digital and digital stories. It also looks into theory surrounding time and place. Section 2.2 presents related work.

Chapter 3 goes through the design and development of the Storix prototype. Scenarios are presented, followed by a description of planned functionality. Further, it presents how Storix has been implemented.

Chapter 4 goes through the exploration of the Storix concept and prototype together with real users.

Chapter 5 discusses the findings, concludes with the viability of the Storix concept, and outlines future work.

Chapter 2

Background

2.1 Stories

Stories are a natural part of human lives; they have been told for ages, and we probably all have memories of being told stories from when we were kids. The traditional ways of mediating a story, are either in writing, orally, or visually. The way of mediating may be viewed as a tool, and various means are available depending on the tool and the purpose of the story: When telling the story orally, the storyteller may add empathy to his voice and use gestures to visualize what is being narrated. The story might also be acted out at a theatre or in a movie, using many of the same means as when telling the story orally. When writing the story down it may consist of just a litany of events, or it can be feasible to use metaphors and other artistic effects to make the story livelier and take the form of for example poetry or a novel.

Different means gives different experiences and feelings for the public. In the digital era, it is possible to use new means that have never been available before. Text, images, sound, and movies may be mixed together in new ways, and the stories need not be linear any more. A story in an old fashioned book need not be read linearly either, but digitizing it can create new ways of searching and navigating it.

As this thesis is much about creating and telling stories, it is important to understand the proper meaning of a story. Therefore, I will begin by looking at stories, both in a traditional sense and in digital form. I will discuss time, place, and multimedia, which are important concepts in augmented storytelling.

2.1.1   What Is a Story?

What is a story? Danielsen [1] defines a story as follows: "We have a story when something is being narrated so that it forms a closed circuit with a beginning, an ending and a central part that tells about a lapse of time and some action that involves one or more actors/participants and has a theme or a problem" (author's translation). This agrees with what Aristotle said in The Poetics 2300 years ago. He claimed that the construction of stories (at least drama and tragedy) "should be based on a single action, one that is a complete whole in itself, with a beginning, middle, and end, so to enable the work to produce its own proper pleasure with all the organic unity of a living creature." [2] Aristotle draws an analogy to living creatures, saying that a story should be an organic whole in itself. By this, he means that the "[...] whole organism is more than the sum of its parts, all of the parts are necessary for life, and the parts have certain necessary relationships to one another" [3]. Aristotle postulates six qualitative elements that a drama must consist of (as explained by Laurel in "Computer as Theatre" [4]) in order to create this organic whole. Drama can be used to understand stories in general.

The six elements of drama identified by Aristotle are spectacle/enactment, melody/pattern, language, thought, character and action. The elements that I have picked out to be of particular importance in the context of this thesis are action, melody/pattern, and character.

Action

There is a need for action in order for something to be called a story: "A story is only a story if at least one event takes place, that is something changes from state A to state B." [5] Most stories connect events and form a plot. According to Forster [6], a story is events in a chronological sequence. These events are connected to each other in a causal and logical structure, forming a plot. He gives the example "The king died and then the queen died" as an example of a story, and "The king died and then the queen died of grief" as an example of a story with a plot; we get an explanation of why things happened.

Melody and Patterns

When a number of events happen in sequence, structure is important. Aristotle mentions this as one of the six necessary elements of drama, in the form of melody, and he claimed that this is the greatest of the pleasurable means. Melody is the pattern of sounds. Laurel says that "the perception of patterns in sensory phenomena is a source of pleasure for humans" [7], and extends the pleasure

of patterns to other means than sound such as the visual arrangement and other sensations. This can be extended further to the arrangement of events in a story.

Danielsen claims that a good story also needs a good point and a style of narration that makes the listener become engrossed in the story. This also comes down to structure and rhythm; if the story is chaotic and it is difficult to follow the progress, it will feel less pleasurable. This is a natural and deep-rooted part of us as humans; according to Lévi-Strauss, the nature and the universe has order and "the thought we call primitive is founded on this demand for order" [8].

Character

The last of the six elements of drama that will be discussed here, is character. This element is not as important to this thesis as action and melody, but it is mentioned to clarify what a character may be to avoid confusion when talking about documentaries later.

An action has to be performed by someone. However, in some stories one does not always see a clear character, at least not in the form of a human being. An example of such a story is a documentary. But this is not a problem: According to Laurel (who has taken this idea from Aristotle), character may be "defined as bundles of traits, predispositions, and choices that, when taken together, form coherent entities" [9]. From this follows the assumption that anything performing action is a character. An example may be a volcano, and a character like this is typically "the star" of a documentary.

2.1.2 Traditional Stories

Stories are part of being human. They can be traced as far back as cave paintings and rock carvings. We must also presume that there are oral traditions prior to this, but there are no certain knowledge of this, as the first tangible evidence of storytelling is what archaeologists have found on rock, clay and papyrus [10]. Why are stories so important that our forefathers put such big efforts into carving stories into rock and clay?

Fisher claims that humans are "homo narrans" [11]. This means that we are story telling animals and that stories and storytelling work as a natural framework for our communication. This paradigm has its critics [12], but the fact that somebody has postulated such a paradigm, gives us a hint about the importance of stories to humans and their communication.

The urge for storytelling has presumably arisen from the need to explain our existence, and particularly the occurrence of unusual and inexplicable events [10]. But stories may also serve

Figure 2.1: An example of rock carving. The picture shows the Bjørnstad Ship, located near Sarpsborg, Norway.

other functions; they may fulfill educational purposes and help instil moral in a culture [13].

Genres from popular poetry like myths, legends, fables, folk songs and fairy-tales [10] may serve as examples of stories. But also happenings from our daily lives are stories. These stories are examples of documentaries.

2.1.3   Documentaries

A documentary is a story that focuses on facts, not fiction. It may be facts about a character, but also about something non-human, e.g. an object or entity like a volcano, historic events, social structures, or anything else. The online version of the Encyclopaedia Britannica [14] defines a documentary as a "fact-based film that depicts actual events and persons." Further, it says that "documentaries can deal with scientific or educational topics, can be a form of journalism or social commentary, or can be a conduit for propaganda or personal expression." As we can see from the definition, a documentary may be plot centred. It does not need actors in the form of human beings.

Documentaries strive to be objective. They consist of facts that are necessary to tell what the narrator wants to say. But different facts may be of different importance depending on who you

ask. Different facts may also twist a story in different directions; if two parts in a conflict are to make documentaries about the conflict, both sides may create documentaries that state facts, but at the same time tell completely different stories justifying the views of the creator. An example to illuminate this may be the subjective understanding of the cause of a car accident: One witness is standing behind two cars that crash, and sees that one of the cars is in the wrong lane. He thinks it is the driver of the car in the wrong lane that has caused the accident. Another witness is standing 50 metres away, seeing the situation from the side. He does not see that one of the cars is in the wrong lane, and has no opinion of who has caused the accident. None of the witnesses saw the dog that ran onto the road in front of one of the cars. Clearly, different stories will surface from this situation.

By making these witnesses combine their experiences into one common story, we may come closer to the truth. This is known as a collaborative story.

2.1.4   Collaborative Stories

As people see things differently, the combination of more than one person's experiences and view may be an important strength to a story. The understanding of what actually has happened may become better and less subjective. In addition, when several people cooperate, they can span over more work, creating more detailed content.

When several people are working together towards a common goal, the concept of boundary objects [15] may be applied. A boundary object is an entity that works as an interface between people with different backgrounds, points of view or from different communities of practice; the boundary objects help promote communication and understanding. For example, when creating a collaborative story, the participants need not understand each other fully: each person that is part of creating the story will experience things differently, but the story that they create collaboratively will help them bring the differences together.

A boundary object may be concrete or abstract, and it may have different function in different situations. When creating a story, the story itself (what has happened) works as an abstract boundary object between the people working on the story. When the story is being mediated, it works as a boundary object between the creators and the receivers. We also have the smaller concrete elements that the story is made up of, for example a text snippet, which works as a boundary object between the authors cooperating on writing that text snippet. We here see that several boundary objects may be in play at the same time, in this case the abstract story, the various concrete building blocks that the concretized version of the (abstract) story consists of, and the concrete version of the story.

2.1.5   Public Authoring: Welcome to Web 2.0!

As the Internet has become something that "everybody" uses on a daily basis to search for information, shop online, and communicate through, it has also become more common to create and share your own content on the Internet. This sharing may be done in several ways, for example by using the discussion sections linked to articles in newspapers, making postings on discussion boards and creating homepages. But the major changes, which have resulted in the term Web 2.0[1], are the phenomenon of social networking sites, blogging and the uploading of videos and photos. These concepts have recently become widespread among ordinary people.

Some say that the first blog actually was the first website [16]: It contained a list of all websites online and was updated every time a new site was launched. However, blogs have developed during the years, and a blog today is more than just a list that gets updated. As the early bloggers wanted to make their lives easier, they created tools to help them create and publish content on the Internet. The most well known blog service is Blogger.com, which was launched in 1999. It lets people create and publish blogs on their servers, as well as letting them set up their own blogging servers [17]. A variant of weblogs, are moblogs (mobile weblogs). Moblogs let you publish content on the Internet from your mobile phone.

In addition to blogs and moblogs, there are other ways and places for the public to publish their own material. Sites like Flickr[2] and YouTube[3] let users publish images and video for everyone to enjoy. Flickr even supports uploading from mobile phones, which enables you to publish your pictures on the Internet almost instantly after shooting them. Other places, like MySpace[4], let users publish their own music, along with traditional blog posts, pictures, videos and discussion forums. These sites have large communities of users.

Even though the above sites specialize on photographs, videos and music, they also allow their users to create and maintain social networks. Other sites are specialized social networking sites, with Facebook[5] as a good example. On Facebook, users use real names and can search for old classmates and friends, enabling them to regain contact. This site also has image galleries, blogs and a lot of other features that enables users to share content.

As places to share thoughts, images, videos, and so on have become more and more popular, the

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[1]There is no clear definition of the term Web 2.0, but it usually refers to the growth of user participation on the net: users is no longer consumers only, they also provide content. It also refers to new technologies and new ways of using old technology, typically AJAX.

[2]http://www.flickr.com

[3]http://www.youtube.com

[4]http://www.myspace.com

[5]http://www.facebook.com

term "user-generated content" has been coined[6]. What distinguishes user-generated content from "other content", is that user-generated content produced by ordinary people, contrary to most of the other content on the web which is often produced by media companies. An example of this is blogging.

Many view blogging as closely related to journalism. The leader of the Norwegian Union of Journalists and the secretary-general of the Association of Norwegian Editors have said in interviews that the Norwegian press organizations will support bloggers who experience pressure to reveal sources which have been promised protection, just like they support journalists and editors [19].

The popularity of blogging and other forms of user-generated content becomes apparent when large commercial companies jump on the bandwagon. For example, Coca Cola was last year caught by forum users, using so-called Undercover Viral Marketing [20]. This means that they have been posting on forums pretending to be ordinary people, tricking the forum community into watching their commercials. Another example is Burger King and their collaboration with the Hip Hop mogul P Diddy, launching their own YouTube "TV channel" [21], a trend also followed by politicians. Also, Facebook has created an API for third party developers and have let commercial actors in.

The fact that huge film and music companies have threatened YouTube and MySpace with copyright lawsuits is also a hint about the popularity of such sites [22]. Two other major hints is Google's acquisition of YouTube, right after Rupert Murdoch had acquired MySpace[7]

2.1.6 Time and Place

When telling a story, you get a sense of time and place. They need not feel important in every story, but they are necessary elements. For something to be a story it needs an event; something has to change from state A to state B. In order for something to change from state A to state B, time is needed. The transformation also needs to take place somewhere. Thus, time and place cannot be avoided in a story.

By presenting time and place explicitly in a story, you go from one to several dimensions. An example of this can be seen in the map by Charles Joseph Minard showing Napoleon's army's advance into Russia in 1812 (Figure 2.2). Here, both time, place and the size of the army is shown in the same drawing. In addition, you can see the temperature on the army's return to Russia at the

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[6]It has been argued that "user-generated content" is a "bad" term and that it should rather be called Authentic media [18]. The author who suggested this admits that this makes the rest of the mediascape "inauthentic", but he claims that he can live with it.

[7]How this involvement (which is most likely motivated by money) will change the online communities formed around these popular web sites in the long run, one can only speculate about.

bottom (to be read from right to left).
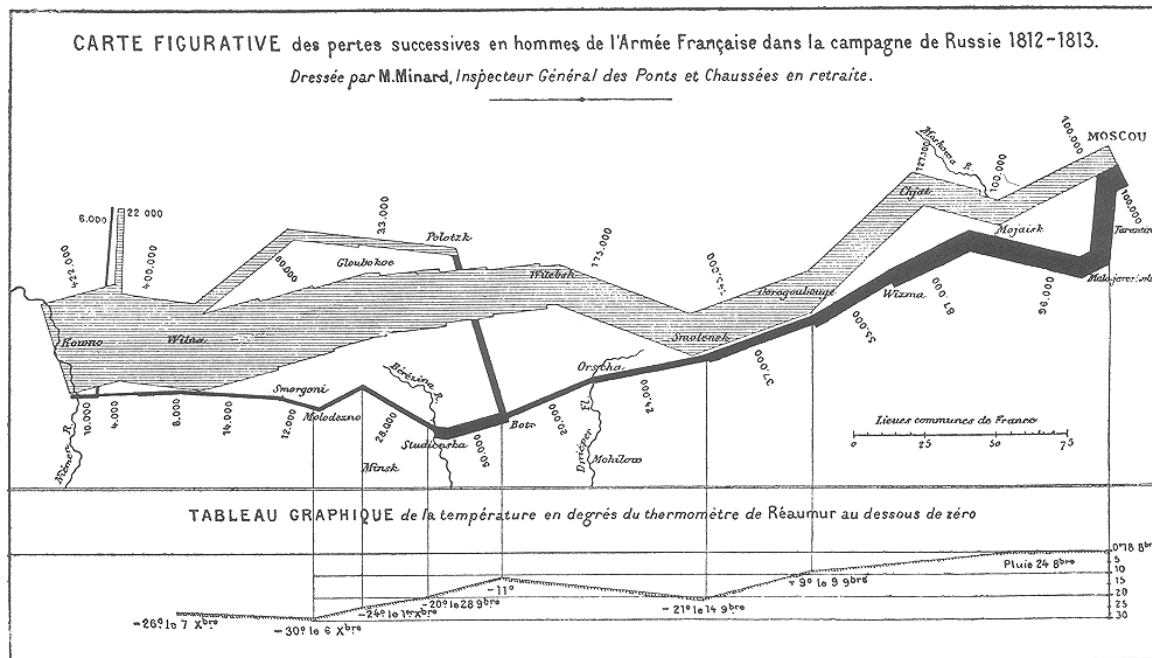
Figure 2.2: Published in 1861, this map by Charles Joseph Minard shows Napoleon's Grande Armée's advance into Russia in 1812 (the drawing is Public Domain).

Visualization of time and space is an important part of the augmented story. I will therefore have a look at some factors that may cause problems when making software that visualizes time and space.

Time: Calendars and Clocks

Time is split up into units that makes it manageable, like years, months, days, hours, and so forth. Calendars and clocks work as tools that help us organize time based on these units: they can help us plan events in the future down to the resolution necessary, and we are also able to review the past in the same way. However, when visualizing time in a digital setting there are a few issues to be aware of.

One problem that comes up when making a calendar, is that there is not an exact number of days in a year (other calendars than the one we use in Norway may have this). The year consists of 365.25 days (on average). The 0.25 spare days each year is collected till they make up one whole day (every fourth year) and then placed at the end of February. This year is called a leap year. Another problem is that each month does not have the same number of days. This is problematic

when counting days between two dates. Both these problems must be taken into consideration when looking up dates backward or forward in time.

To further complicate the use of time, it is not the same everywhere (the date may not be the same either). As the sun moves across the sky and is not at the same height everywhere at the same time, and because of the fact that the position of the sun is relative to the person observing it, time will differ from place to place. To make this problem manageable, the earth is divided into different time zones: Instead of having a clock that continuously has to adjust itself when moving around on the earth's surface, time will only have to be adjusted when moving from one time zone to another.

Even though the use of time zones simplifies use of clocks relative to location, it does not entirely solve the problem of different times at different places. If two persons in two different time zones have an appointment (for example a phone meeting) at two o'clock, they will miss each other if both use local time. To help situations like this, one may follow universal times like GMT or UTC[8].

It is problematic to visualize two events that happen simultaneously but at different times (as they are in different time zones) in a calendar or a clock without using an universal time standard. But the use of universal times may remove context that is important to a story. For example, if you say that you are eating in Dubai at 12:30pm local time, the person being narrated the story assumes that you are eating lunch, and may have an idea of how life is like in Dubai at lunch time. But if you say that you are eating at 08:30am UTC, the reader will assume that you are eating breakfast, if she does not do the calculation from UTC to local time. This leads to an unintentional change of how the viewer sees the context.

Location: Maps

Maps may be used to locate where you are. But it can also, just like an almanac or calendar, be used to say something about the past or the future. You can see where you have been, and you can plan where you want to go.

Interactive maps have become common on the Internet the last few years. A wide selection of different web pages now uses maps, for examples travel agencies, online phonebooks and other sites that need to show information related to location. Especially newspapers have adopted maps when covering various topics, for example when Hurricane Katrina struck the United States in 2005.

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[8]GMT (Greenwich Mean Time) and UTC (Coordinated Universal Time) are practically the same in this context. The difference is that GMT is based on the earth rotation around its axis and its orbit around the sun, while UTC is an atomic time standard.

The rise of online services that offer maps for free is one of the reasons why maps have become so widespread. Examples are Google Maps[9], MapPoint[10] and OpenLayers[11], which all provide much of the same functionality. Also, standardization work done by Open Geospatial Consortium (OGC)[12], an international industry consortium of 351 companies[13], has played a role. There are even voluntary map projects, like Open Street Map[14], which offer maps that are both "free as in beer" and "free as in speech"[15].

Implementing an interactive map on the web is a lot of work. However, some of the services offer public API's which facilitates the process as they include software to view and navigate the maps in addition to the map data. This makes it easy to create a website using maps. Google Maps is one of the services that offers a public API, thus it is often used in so-called mash-ups: a web site that uses content and/or services from various sources. A typical mash-up scenario is that maps are fetched from Google and data to be plotted on the map (e.g. locations of houses for sale) are fetched from other web sites.

2.1.7   Illustrations (non-text)

Text can say a lot, but some things are difficult to explain with text. "A picture says more than a thousand words" is a famous saying and pictures, video, and audio are aids that can help to augment a story and help a narrator say more when words are insufficient.

Using more than one type of media is a good thing, as it, when used right, has the power to make stories more interesting: "Multimedia enhances minimal text-only computer interfaces and yields measurable benefit by gaining and holding attention and interest; multimedia improves information retention. When properly woven, multimedia can also be profoundly entertaining" [23]

In addition to holding attention and creating a more entertaining experience, multimedia is also good for learning and understanding, especially when interactive, as explained by Cairncross and Mannion [24]:

> The key features of multiple media, user control over the delivery of information and
> interactivity can help learners come to a deeper understanding through

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[9] http://maps.google.com
[10] http://www.microsoft.com/mappoint/
[11] http://www.openlayers.org/
[12] http://www.opengeospatial.org/
[13] As of 8th of August, 2007.
[14] http://www.openstreetmap.org/
[15] Many services, like Google Maps, are "free as in beer", but has restrictions on usage.

- Supporting conceptualization and contextualization of the new material being presented
- Actively involving the learner in the learning process
- Promoting internal reflection

Visualizations of time and place (discussed in Chapter 2.1.6) will also fit into this, as they also can be viewed as multimedia elements.

2.1.8 Digital Stories

This thesis has already touched into digital aids in storytelling, but the question "what exactly is a digital story" is yet to be answered. When googling the term "digital story", you will get a lot of hits (close to 248 000 in the beginning of July 2007). When looking closer at some of these hits, it becomes apparent that there are different views of what a digital story is.

Earlier, digital storytelling was a term mainly associated with virtual reality and games. This is not the focus of this thesis. Instead, it focuses on some more recent and emerging forms of digital storytelling where the focus is on user generated content and experiences.

Examples of Digital Storytelling

One example that comes up when googling the term "digital story", is Photobus[16]. Photobus view digital stories as "a particular movie-like form of short narrative that is written in the first person and, with feeling and hopefully some elegance, relates experience which is specific to the storyteller. Favoring still photography over video, it observes a scrapbook aesthetic." [25] Further, they have another definition with a slightly different twist: "Digital Stories are short, personal, multimedia tales, told from the heart. Anyone can make them and publish them on screens anywhere. They have the potential to be a very democratic kind of storytelling." [26] Photobus also have a strict boundary to what they view as a digital story. It should not be more than 250 words, it should contain a dozen or so pictures, and the length should be about two minutes. In the examples on their site, videos (both with slide shows and with live video) are combined with short texts or with a narrator speaking while the pictures are changing. Various media formats are used, like Macromedia Shockwave and RealMedia. An excellent example of what Photobus does, can be seen

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[16] http://www.photobus.co.uk/

in the Capture Whales project[17]. This is a workshop that they did together with the BBC.

An initiative that has a similar approach to digital storytelling such as Photobus is the Center for Digital Storytelling[18]. This is a California-based non-profit arts organization. They work with community, educational and business organizations in addition to offering public workshops. What best describes their approach is "its emphasis on personal voice and facilitative teaching methods" [27].

Another typical form of digital storytelling that shows up when searching the Internet is the ones where people, with the help from various types of equipment, get a story told when they are at a specific location. One example of this approach, is the "34 North 118 West" project [28] in downtown Los Angeles. In this project, parts of the story are revealed as you move around the city entering different locations. The participants have to carry a GPS, a lap top computer and a pair of headphones. While moving around, they can see their location on a map. When approaching a location where information is available, a voice will start speaking through the headphones. Some of these spots are marked on the map; some are left to be discovered. In this way, people can experience past and present at the same time, as the story is made up of different layers in time. This type of digital storytelling is often used in the context of education or at museums.

Urban Tapestries [29] is yet another approach to digital storytelling. It is "an experimental software platform for knowledge mapping and sharing – *public authoring*." It "combines mobile and Internet technologies with geographic information systems to allow people to build relationships between places and to associate stories, information, pictures, sounds and videos with them." Proboscis (the group behind Urban Tapestries) have a research programme going on called Social Tapestries [30] where they run various experiments with local groups and communities "investigating the social and cultural benefits of public authoring".

Although there seem to be many different definitions of what digital storytelling is, there are some common factors. In all the different variations, multimedia is used to enrich the story that is being told. Another common factor (at least when it comes to the projects that have been presented here), is that a lot of the people and groups involved in telling digital stories seem to have a background in arts more than technology. One result of this, is that the use of technology may be a bit limited. They may not know what can be done or how to do it, which may influence and limit the way the stories are made and presented. The positive thing about this, however, is that the stories are probably not drowned in technology; the focus is on the story, not on fancy technology. The best would probably be to find a balance between the two.

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[17] http://www.bbc.co.uk/wales/capturewales/
[18] http://www.storycenter.org/

Concrete Examples of Digital Stories and Non-Stories

I will now present a few examples of what I concider digital stories and what I do not consider a digital story in the context of this thesis. The Genesis is the first story to be looked at.

The Genesis is the Christian story of creation. This is a well-known story to Christians. It has the form of a traditional story with a beginning, middle and an end. At Kids 4 Truth you can find the Genesis presented as a Flash animation[19]. In the flash version, graphics and text are used to visualize the story, and music is used set a mood. It is structured like a traditional, linear story. However, the user is allowed to skip between the days if wanted. This is a good example of a digital story.

Travelogues[20] are also perfect examples of stories in this context. At the Travel Central[21], you can find several examples, for example the one called "Grand Canyon Rafting"[22]. The story is presented on a day to day basis, and consists of text, pictures, and links so that the reader can move from day to day. The story is mostly rattling off, but it has a plot; going to the Grand Canyon rafting.

At National Geographic's website, you can find something that may be confused with a story. In the multimedia presentation "Refuge in White"[23] a person is being interviewed. There are elements of a story in what he tells, as he, among other things, explains in sequential order how polar bears behave at a particular time of the year. But the video itself is not a story; it only contains facts and historical facts about Canada's Wapusk National Park and polar bears in general. Only parts of the presentation are sequential. Also the presentation is divided into three parts explaining different things. The natural structure of a story as the one presented by Aristotle is not present.

An example of something that is not a story is the "Theory of Relativity Video"[24]. This video is a documentary, but does not have events that can be put into time and place in the sense that we know from stories.

Another example of something that I do not consider a story is a typical slide show[25] presentation, for example a lecture. A presentation like this may be used to tell a story, but a lecture need not be a story in this context. A good lecture should have a progression that will let the student follow it, with a beginning (introduction), middle (body) and ending (conclusion, wrap-up), but it does not necessarily contain a plot that unfolds in time and space, nor a character. An example can be found

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[19] `http://www.kids4truth.com/recreation.swf`

[20]

[21] `http://www.logicalrealism.org/travel/`

[22] `http://www.logicalrealism.org/travel/logs/gcanyon/index.php`

[23] `http://www7.nationalgeographic.com/ngm/0512/feature2/multimedia.html`

[24] `http://www.allaboutscience.org/theory-of-relativity-video.htm`

[25]For example made in Microsoft Power Point or Open Office Presentation.

at `http://notes.corewebprogramming.com/student/JavaScript.pdf`

Google Maps[26] is a clear example of something that is not a story. Google Maps may be used in order to tell a story, but Google Maps itself is only a visualization tool to show the earth. There is no beginning, middle or end, no plot and no character in Google Maps itself.

2.2 Related Work

In Chapter 2.1.8, a few examples of related work (dealing with digital stories) were presented. In this section, projects and examples that are more relevant the concept discussed in this thesis will be presented.

2.2.1 Requirements for In-Situ Authoring of Location Based Experiences

At museums and historical places, digital guides are often used. One problem with these is that their content tend to get outdated after a while. Upgrading the content often requires help from people with technical knowledge. To avoid this, a system where curators and others could update the content themselves was wanted. A project dealing with this was carried out at Chawton House, England [31].

In addition to the curators involved, teachers from Whiteley Primary School helped by making a guide for pupils aged 10-11. The pupils participated by creating small stories about their findings.

The article looks at the process of creating content in-situ, in addition to editing and reorganizing the content later. The goals of the project were to 1) "Develop a persistent infrastructure that can support a wide range of experiences that draw on common resources such as defined locations and audio clips. 2) to learn about the needs of user authoring in this context in order to develop authoring tools."

Workshops were held so that teachers and curators could understand how the guiding worked. The first was a simple sound guide made by the curators. The second was created by teachers and used material created by curators. The focus of the workshops with the curators was to understand the setting, discuss the concept for device enabled guiding, and to gather content. The objective of the teachers' workshop was to understand the organization of trips. In this workshop, a route was established. Assignments for the pupils were also made. Three workshops with each group were held before the pupils did their trip.

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[26] `http://maps.google.com`

The pupils' trip consisted of two parts. First they explored the area freely, gathering information and impressions. They then met to share their experiences, before separating and being sent off to two places of their own choice. Here they made stories.

After the workshops, it was concluded that it is essential to create the content on the spot. It should also be possible to edit and refine the material afterwards. Generating the content should be as simple as possible and should not require much time; it should not feel as the main activity.

In the second part of the experiment, a PDA-based tool was designed and given to a librarian who was to use it with as little help from the researchers as possible. During this experiment, information (audio clips or instructions) were represented as "cards", each with one "item" of information, and could be annotated with contextual metadata and put into sequence. Both the generation of content and meta data was carried out. To add an item, a location had to be defined first.

This part of the experiment concludes (among other things) that it should be possible to define locations both a-priori and ad-hoc. As it is difficult to write text on a PDA in-situ, the use of audio notes would be useful. This use of audio would need to be learned so that the users do not use too much time thinking about what to say and thus loose focus. Incrementally building up and changing content could be an integral part of curators' work practice.

2.2.2 MyLifeBits

MyLifeBits[27] is a project concerning all kinds of data that a user might be interested in saving. This includes digital media, emails, calendars, contacts, documents, web pages visited, and practically everything that can be digitized. You can add annotations and other information to each item, both as audio notes and as text.

Media can be organized and navigated in several ways. You can do full-text searches, create collections of items, and save search queries. You can find things through a calendar or through a timeline. As information also may overlap in time, you can find a web page that you visited during a phone call by first finding the person you talked to, then finding the phone call, and lastly see what web pages you visited during that phone call. It is also possible to geotag information, for example pictures.

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[27] `http://research.microsoft.com/barc/mediapresence/MyLifeBits.aspx`

2.2.3   Various Google Projects

Google have several ongoing projects related to location, as well as time. One of them is the Google Book Search[28]. This project digitizes books and makes them (partly) viewable on the web, and allows you to search inside them. For some books, locations that are mentioned in the text can now be viewed with Google Maps. The locations are viewed on the general page presenting the book, and the places mentioned in the book itself are not clickable. But if you click a location, you will get a text snippet from the book mentioning the location, along with links to the actual pages in the book.

In addition to all the location oriented tools by Google, they also have projects involving time. On the Google Experimental Search page[29], there is a timeline search available (Figure 2.3). Here, you can search for any term and get the web pages returned sorted in chronological order, presented together with a timeline. By adding "view:timeline" to the search query on the Google Experimental Search page, this is achieved. By adding "view:map" instead, you will get the results returned together with a map showing the location of all of the hits from the search. The two can not be combined.

Figure 2.3: The Google Timeline Search, which gives you search results in chronological order. The number of hits is visualized with bars on the timeline.

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[28] `http://booksearch.blogspot.com/2007/01/books-mapped.html`

[29] http://www.google.com/experimental/

2.2.4   Gutenkarte

Gutenkarte [30] is a geographic text browser that uses public domain texts from Project Gutenberg [31]. It extracts geographic locations from the texts and presents an interface where they can be browsed by chapter, place, or both at once in an interactive map.

2.2.5   Magnalox Viewer

Magnalox[32] has a concept called Magnalogs (Figure 2.4), where you can present stories. It consists of a map and a set of controllers, like "Play"- and "Stop"-buttons that will let you view the story. A cursor follows the track of the story (which has already been drawn on the map), and will stop at points in the map to present text, pictures, and possibly other media beneath the map. Timestamps are shown for each stop. Information like speed and height above sea level, is also viewable, and has its own cursor which moves along synchronously with the cursor in the map. Various maps can be used, e.g. Google Maps.

In this chapter, background information related to augmented stories has been presented. Further, the term Web 2.0 has been explained to provide context for the concept of augmented storytelling on the Internet. Theoretical aspects surrounding stories and storytelling have also been presented, along with some theory related to digital visualization of time and location. Further, examples of related work have been presented. The next chapter deals with the design and development of Storix.
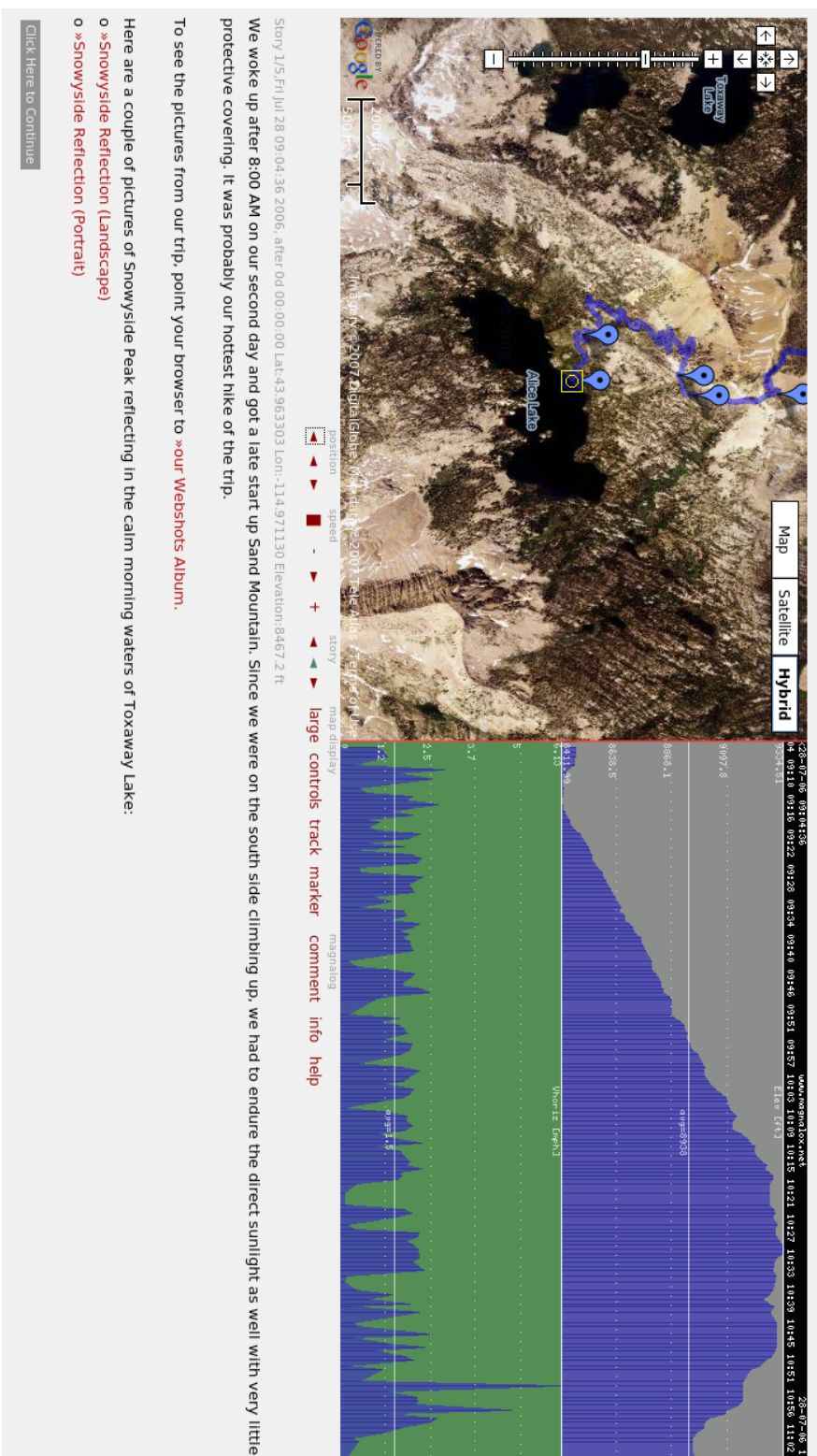
---

[30] `http://gutenkarte.org/`
[31] `http://www.gutenberg.org/`
[32] `http://www.magnalox.net`

Figure 2.4: A Magnalog example, "Sand Mountain Pass Backpack", using Google Maps

Chapter 3

Design and Development of Prototype

3.1 Scenarios

The first step of the design phase, was to create scenarios for possible usage. The purpose of these was to get ideas about how Storix could be designed. Five scenarios have been made, and will be presented in the following sections.

3.1.1 Retelling Your Vacation

Imagine you are going on a vacation to South Africa. You are staying there for three weeks and will travel from Namibia to Zimbabwe through Botswana. You will travel through areas with wild animals and exciting peoples and cultures. You bring a video camera, a digital camera, and a laptop with you so that you can film, take still pictures and write small snippets of text while travelling. The purpose is both to capture memories but also to be able to retell your trip to your friends when you get home. In addition to the media devices, you bring a GPS so that you can connect your media to the place where it was captured.

When you get home, you import all your media onto your computer. Through a program, all the media gets synchronized in time so that it can be presented on a web page with a map and a timeline. When dragging the timeline, you will be able to see on a map where you were at a particular time. When clicking placemarks on your route, different media that you made at that particular spot will pop up.

In addition to all the text that has been written during the three weeks in Africa, you write an introduction and an ending for your story where you tell about the background and sum up your

experiences.

3.1.2 Journalism

You are a journalist who just have received a tip about a bank robbery. You are rushing to the crime scene and are able to take some pictures. You also interview a police officer and a couple of eye witnesses. You use your PDA to write down the interviews, and immediately upload the media that you have collected to the editorial office, where it is received by one of the web editors.

The web editor starts a new news case. He adds the media that he has received, in addition to the GPS position of the journalist. He then publishes the case.

At the same time, a reader of the online newspaper refreshes his web browser. He immediately sees the case about the robbery, and clicks it. A map and a timeline show up on the screen. He reads the introduction to the case, and by scrolling the timeline, he can see on the map where the robbery took place.

While the reader is learning about the robbery, the editor receives information about how and where the robbers escaped from the bank. He adds their escape route and the position where the escape cars were found together with text describing what is known about the escape.

In the mean time, the reader is still scrolling the timeline, and sees that new information has been added. He can now see how the robbers escaped.

3.1.3 School Trip

A school class is going on a trip to a forest to observe the plant and animal life there. They bring a GPS unit along, which saves their track with timestamps. Two of the kids take pictures, while another writes short notes about the setting for each of the motives captured. Some of the other kids make sound recordings in which they explain what is going on as they move through the forest. Each time they start a new recording, they say what time it is.

When the kids get back to school, they transcribe the sound recordings and elaborate with additional information. All the content is then uploaded, and as the texts contain time stamps, they are automatically linked to location.

3.1.4 Crime Investigation

At a police station, an officer is presenting what the police know about a bank robbery that just took place. He has reconstructed the course of events by adding positions, time and pictures of things

that may be possible evidence against the robbers. While he is dragging the timeline and explaining the events that have been added, one of the listeners points out that he has forgotten an important detail. The detail is added immediately.

Later the same day, one of the detectives working on the case is a little unsure about the course of events. He logs on to the intranet and opens Storix. He scrolls through the timeline and is able to jump back and forth through the events until he gains a clear understanding of what happened where and when.

3.1.5 History Education

A teacher at junior high school is teaching history. He stresses that there is always a cause and a result in history; nothing just happens. It is important to remember and understand what has caused a historic event. With a projector, he presents a map. By dragging a timeline, various events pop up on the map, and pictures are shown while he explains what happened. When the students get home, they can log on to the schools web page and see the same presentation as the teacher used in class. They can also add new events themselves.

3.2 The Structure Of a Storix Story

In order to present a story digitally, it is important to find a good structure for how to store the story. How strict this structure is will influence how an author will be able to tell a story; there is a risk that a structure which is either too strict or unnatural will limit the author and force him to alter the story in an unfavorable way. Therefore, it is important that the structure is loose enough for the author to feel that he can present the story in a way that feels natural.

Several digital formats for organizing text and other content exist. Common for many of them is that they allow the user to create content and structure in a presentation-neutral way. This allows the content to be published in various forms, for example as HTML or PDF without changing the original document. Examples of such formats are LaTeX, DocBook and HTML.

3.2.1 Structure

LaTeX[1] is a typesetting system which is designed to let an author focus on content, not on design. The author will structure his document with chapters, sections, figures, tables and other well known

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[1] `http://www.latex-project.org/`

concepts, while LaTeX takes care of the layout. It is flexible and used for a lot of different types
of documents, from articles, technical and mathematical documents, to whole books. Below is an
example of a short LaTeX document[2]:

```
\author{Ola Nordmann}
\title{A Short Story}
\date{\today}
\begin{document}
  \chapter{Lorem ipsum}
    Lorem ipsum dolor sit amet, consectetuer adipiscing elit.
    \section{Lacinia Urna}
      Aenean lacinia urna at dui. Donec pede turpis, aliquam sit amet,
      aliquam a, ultrices et, ligula. Class aptent taciti sociosqu ad
      litora torquent per conubia nostra, per inceptos hymenaeos. Nam
      tempor semper magna.
    \section{Convallis Feugiat}
      Morbi orci augue, tincidunt eu, laoreet vel, convallis feugiat,
      lectus. Aliquam mattis, mauris nec commodo porttitor, arcu
      ligula pulvinar pede, bibendum posuere nunc dolor eu velit.
\end{document}
```

DocBook[3] is a document format made for technical documents, especially computer software
and hardware. It can be written either in SGML or XML format, and it is defined with schemas in
different languages (e.g. XML DTD or W3C XML Schema). Just like LaTeX, it defines logical
elements in a document as in this XML example:

```
<book id="short_story">
  <title>A Short Story</title>
  <chapter id="chapter_1">
    <title>Lorem Ipsum</title>
    <para>
      Aenean lacinia urna at dui. Donec pede turpis, aliquam sit
      amet, aliquam a, ultrices et, ligula
```

---

[2]Lorem Ipsum has been used for the text. For details, see `http://www.lipsum.com/`
[3] `http://www.docbook.org/`

```
      </para>
      <para>
        Class aptent taciti sociosqu ad litora torquent per conubia
        nostra, per inceptos hymenaeos. Nam tempor semper magna.
      </para>
    </chapter>
    <chapter id="chapter_2">
      <title>Convallis Feugiat</title>
      <para>Morbi orci augue, tincidunt eu, laoreet vel.</para>
    </chapter>
  </book>
```

Another standard that is written particularly for web use is HTML. As HTML is not meant for any particular content type, it is much looser than LaTeX and DocBook. It contains six header levels which is defined with the tags <h1> to <h6>. It does not define chapters or sections beyond this. Here is a short HTML example:

```
<html>
  <head>
    <title>A Short Story</title>
  </head>
  <body>
    <h1>A Short Story</h1>
    <h2>Nam Tempor</h2>
      <p>
        Aenean lacinia urna at dui. Donec pede turpis, aliquam sit
        amet, aliquam a, ultrices et, ligula
      </p>
      <p>
        Class aptent taciti sociosqu ad litora torquent per conubia
        nostra, per inceptos hymenaeos. Nam tempor semper magna.
      </p>
    <h2>Convallis Feugiat</h2>
    <p>Morbi orci augue, tincidunt eu, laoreet vel.</p>
```

```
    </body>
  </html>
```

All the above formats consist of a top-level element (begin{document}, <book> and <html>). This top level element is filled with content and meta data describing the content. Even though the elements are named differently, they all basically have the same structure. Further, the formats all have a hierarchy of headers, and paragraphs.

The Storix format should follow a similar approach to structuring content as the above formats. It should contain a top level element ("Story"). It should allow elements for text and other media. But how deep should the hierarchy of the stories be? The formats presented above vary on this, LaTeX having the shallowest hierarchy with only four levels (Chapter, section, subsection and subsubsection). This should be sufficient for Storix too. But could we reduce this further? If we look at fictional books, they seldom have deep hierarchies of headers. Often they only have chapters. The same applies for comic books. However, as Storix is not meant to limit the author, it should be possible to use more levels if needed. The fact that all stories in Storix will be converted to HTML in the end could be exploited, letting the author add HTML headers from level <h3> to <h6>[4]. This could be done either manually by adding tags or by assigning headers (of different levels) to any event, and would not change the overall data structure of a Storix story. The problem with this is that it binds the stories to HTML, and the former variant may also introduce a possibility for an author to make a hierarchical mess. Another and better solution than exploiting HTML headers, is to allow recursive episodes. This means that an episode may contain subepisodes (as shown in Figure 3.1), and that each episode is allowed to have a header. Storix will determine the correct level (and thus font size) of the header due to how deep the episode is in the hierarchy.

In the above paragraph, the term episode is used to describe a part of a story. An episode at the highest level is similar to a chapter, but the term episode has been chosen due to the nature of the stories presented in Storix. It is believed that the stories will be rather short, and chapters are often associated with longer texts: A chapter is "One of the main divisions of a relatively lengthy piece of writing, such as a book [...]" [32]. An episode, on the other hand, could be described as "a portion of a narrative that relates an event or a series of connected events and forms a coherent story in itself; an incident: an episode in a picaresque novel." [33].

The leaf nodes of an episode hierarchy will be the actual content of the story. The content is, as we can see from the definition above, bundled into events. In Storix, an event is something that can be linked to a point in time (or an interval) and a location. Events are so small that they do not

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[4] <h1> should be reserved for story title, and <h2> for episodes.

require a header. It is tempting to relate an event to an action, but the following example from the book "The Shadow of the Wind"[34] shows that an action can contain sub actions. The following event takes place as the main character, Daniel, is coming to get Fermín and bring him to his father's bookstore:

> I found Fermín Romero de Torres in his usual lodgings below the arches of Calle Fernando. The beggar was putting together the front page of the Monday paper from bits he had rescued from a waste bin. [...]
>
> "Good god! Another dam!" I heard him cry. "These fascists will turn us all into a race of saints and frogs."
>
> "Good morning!" I said quietly. "Do you remember me?"
>
> The beggar raised his head, and a wonderful smile suddenly lit up his face.

We can see that there is one main action going on (get Fermín), but the text has been spiced up with several other actions that overlap the main action. Fermín is reading a newspaper, words are exchanged, Fermín smiles. It is the main action that is treated as an event in Storix.

An event should, in addition to text, also be able to hold one or more other media elements like images and video. This way, an event can be presented with e.g. both text and images.

3.2.2 Metadata

The stories should follow the Dublin Core standard. Dublin Core is a standard for meta data made by The Dublin Core Metadata Initiative. It contains a set of meta data elements which are supposed to "facilitate the finding, sharing and management of information" [35]. The Dublin Core Metadata Element Set version 1.1[5] is meant to help identify any information resource, and contains 15 elements: Title, Creator, Subject, Description, Publisher, Contributor, Date, Type, Format, Identifier, Source, Language, Relation, Coverage and Rights. It is important to note that Dublin Core only says something about which element should or could be present, and does not say anything about which format to use.

In addition to the stories following the Dublin Core standard, events should also (at least partly) follow this standard. This is to enable the use of viewpoints in a story[6].

There are some types of meta data that are not covered by Dublin Core. The biggest difference between the Storix structure and the document formats mentioned in the previous section, is that

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[5] `http://dublincore.org/documents/dces/`

[6] A nice feature for collaborative stories would be to choose from who's viewpoint one wants to see the story. This will, however, not be implemented in the prototype.
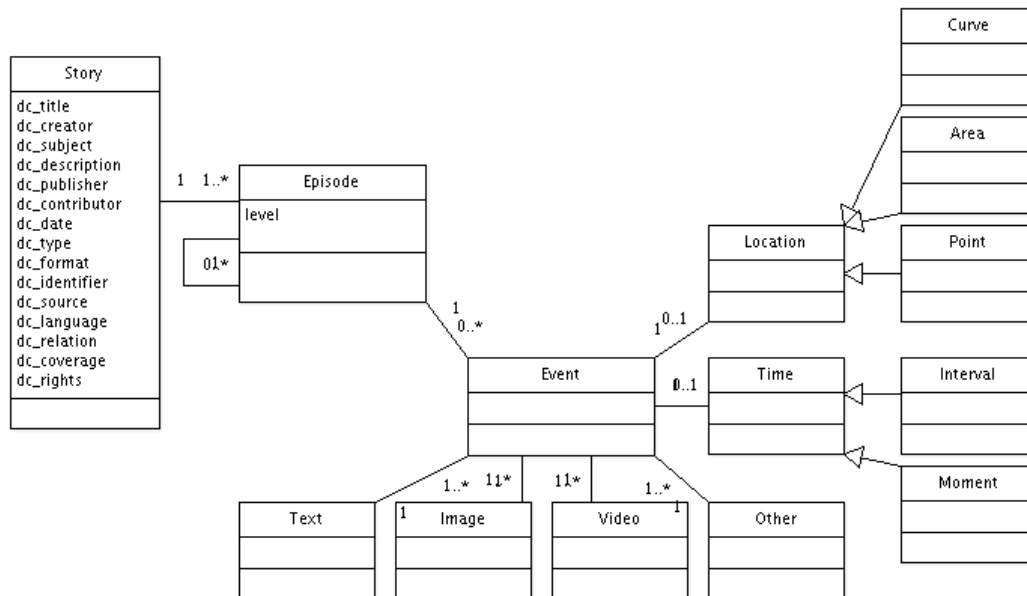
Figure 3.1: The structure of a story in Storix. Each story can contain one or more episodes, which again contain events. Each event will contain content (text, images, videos, or other types of objects, for example a PDF document). Each event is connected to a location and time. The GPS track connected to a story is not shown in this model.

the events in Storix should have a reference to time and location. Here, Dublin Core can not help as it does not support these elements. It does have a Date element, but this is only a date, not a timestamp. Further, the date of creation of the document does not necessarily coincide with the date the event actually happened. Because of this, we have to create a timestamp element.

For location, the GeoRSS format can be of help as two data elements has been defined for saving location information. Here is an example:

```
<geo:lat>37.416384</geo:lat>
<geo:long>-122.024853</geo:long>
```

Figure 3.1) shows the structure of stories in Storix. Note that Dublin Core is not shown in relation to events in the model. Also, the GPS track is not shown in the model.

3.2.3   Validation of Story Structure With a Real Story

To see if the model presented in Figure 3.1 fits stories in general, some stories (a couple of them mentioned in Chapter 2.1.8) have been used to validate the model.

The Genesis

In The Genesis (see Chapter 2.1.8), we can see several actions taking place as God creates the world in six steps. How this story should be split up depends on how detailed the presentation is. In the case of the presentation by Kids4Truth there are not many details, thus each day could be an event. If the story had been presented in more detail, it would have been suitable to treat each day as an episode containing several events, which again contain text and media.

It appears from this story that assigning time and location may be difficult in some cases. There is time and location present in the story, but no timestamps can be given (beyond that it was the first seven days of the universe), nor any coordinates saying where it took place (in latitude and longitude).

The Life of Vasco Da Gama

The life story Vasco Da Gama[7] does fit with the Storix model with regard of time and location: there are events linked to fairly accurate times and locations. It is, however, problematic that not all times are accurate: for example, his date of birth is not known (it was either 1460 or 1469). In situations like this, time spans could be used or a decision about what time to use should be made.

In this story, events can be grouped into episodes: for example, his early life could be one episode, and each of his voyages their own separate episodes. Sub-episodes can be used, depending on the level of detail to be presented. Images and drawings may also be added to the story.

The Grand Canyon Rafting Travelogue

In the Grand Canyon Rafting travelogue (also mentioned in Chapter 2.1.8), each section consists of one day. The structure may be kept, and each day may be fitted into one episode. Further, each day consists of many actions, which can be treated as events. The events consist of both text and pictures. This story fits nicely into the Storix framework.

As we can see from the three stories mentioned here, not all stories fit into the model. In order for a story to fit into the Storix framework, it will have to consist of exact times and locations. Further, an author can adjust his story for it to fit differently into the framework, depending on the level of detail.

---

[7]See e.g. `http://en.wikipedia.org/wiki/Vasco_da_gama`

3.3   Overview of the Storix Concept

As we now have an overview of the foundations for Storix (different scenarios of usage, how stories should be structured, and technologies to be used), it is time to look at what Storix itself could do and how it should work.

The main ingredient of the Storix concept is content: No content, no stories. But just as important as content is the context in which the story has unfolded. The content will help establish awareness of the context: people and places are described, we get a sense of time and so forth. However, by explicitly presenting context information, it is possible to recreate more of the context in which the story originally unfolded in.

One of the main intentions of Storix is to augment stories with context information, more specifically time and location. By showing the user where events took place (for example through a map) and when they took place (for example through a timeline) the user will get a clearer understanding of these aspects of the context. Means like maps and timelines are useful tools for presenting such information.

Context can also present a new way of navigating the story: Instead of only being able to scroll text and receive context information from this, navigating through time and place could be a possibility. For example, by clicking events on a map, you could see what has happened at that location. Further, by clicking on the timeline, you could see what happened at that exact time.

The Storix client will thus consist of three main components that will attempt to retell a story, as well as recapture the context in which the story originally unfolded. One of the components should deal with time, one with location and one with text and media. For time, a timeline will be used, and for location, a map. In figure 3.2 you can see a proposed layout for the various elements of Storix.

In addition to knowing which elements are needed, one need to know what users should be able to do. In the following section, some essential use cases will be presented, together with sequence diagrams covering each use case.

3.3.1   Use Cases

Four main use cases have been identified (Figure 3.3). There are other use cases (for example, zooming the timeline) in addition to these, but they do not represent core functionality in Storix and will therefore be left out.
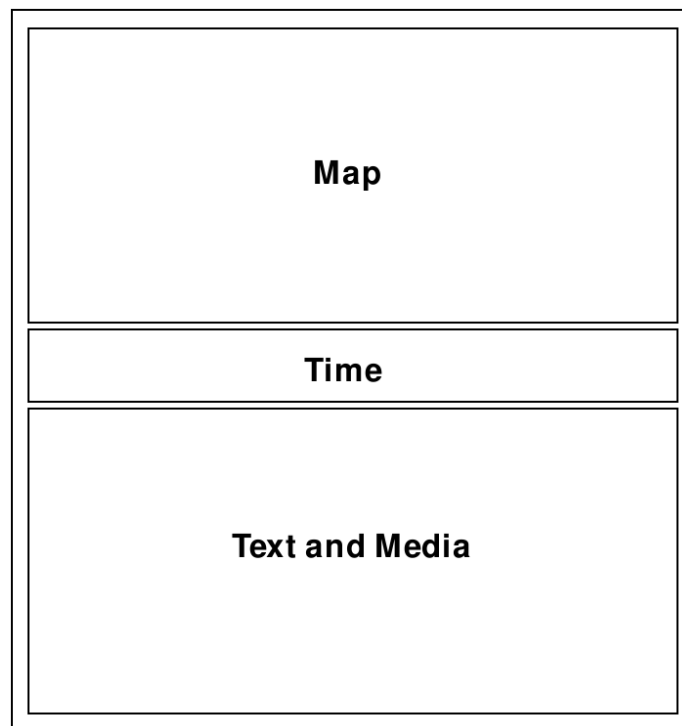
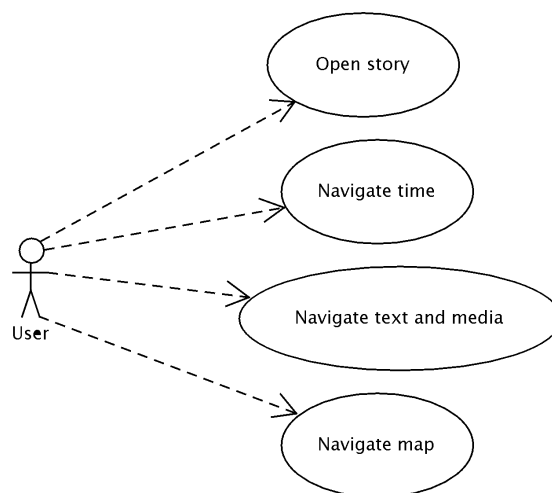Figure 3.2: The components in the view: Map, time and text/media.

Figure 3.3: User and system use cases

Use Case number	1
Use Case name	Open Story
Summary	Lets the user open a story
Actor	User
Precondition	Web site is loaded
Description	1. The user clicks drop down list containing stories 2. The system opens drop down list 3. The user selects story from drop down list 4. The user clicks "Open Story" 5. The system opens the selected story
Alternatives	
Postconditions	The system has opened a story.

Use Case number	2
Use Case name	Navigate by time
Summary	Lets the user navigate the story by time
Actor	User
Precondition	Story has been loaded (Use Case 1)

Description	1. The user drags the timeline
	2. The system updates the timeline view
	3. If the timeline center mark hits an event marker:
	    – The system focuses on the selected event in the map
	    – The system focuses on the text and media for the selected event

Alternatives	• Instead of step 1, the user may click the arrow buttons on the timeline • Instead of step 1, the user may click an event marker in the timeline
Postconditions	• The timeline view has been updated. • Current event in timeline is also shown in map and in text and media view.

Use Case number	3
Use Case name	Navigate by location
Summary	Lets the user navigate the story through select events from map
Actor	User
Precondition	Story has been loaded (Use Case 1)
Description	1. The user clicks an event in the map 2. The system centers the selected event in the timeline 3. The system focuses on the text and media for the selected event
Alternatives	
Postconditions	• The map has been updated. • Current event in map is also shown in timeline and in text and media view.

| Use Case number	4
Use Case name	Navigate through text and media
Summary	Lets the user navigate the story through the text and media view
Actor	User
Precondition	Story has been loaded (Use Case 1)
Description	1. The user scrolls to an event in the text/media view 2. The user clicks the event in the text/media view 3. The system centers the selected event in the timeline 4. The system focuses on the text and media for the selected event 5. The system focuses on the selected event in the map
Alternatives	
Postconditions	• The text and media view has been updated. • Current event in text and media view is also shown in map and in timeline.
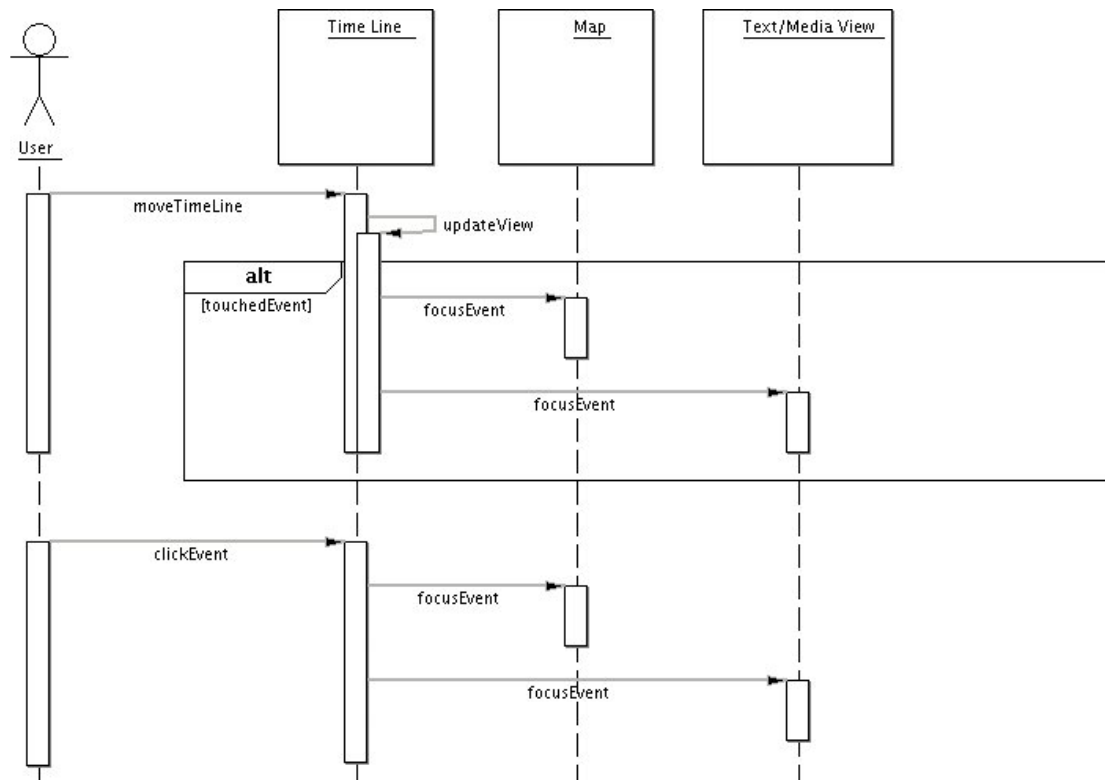
Figure 3.4: The user moves the timeline or clicks an event in the time line.
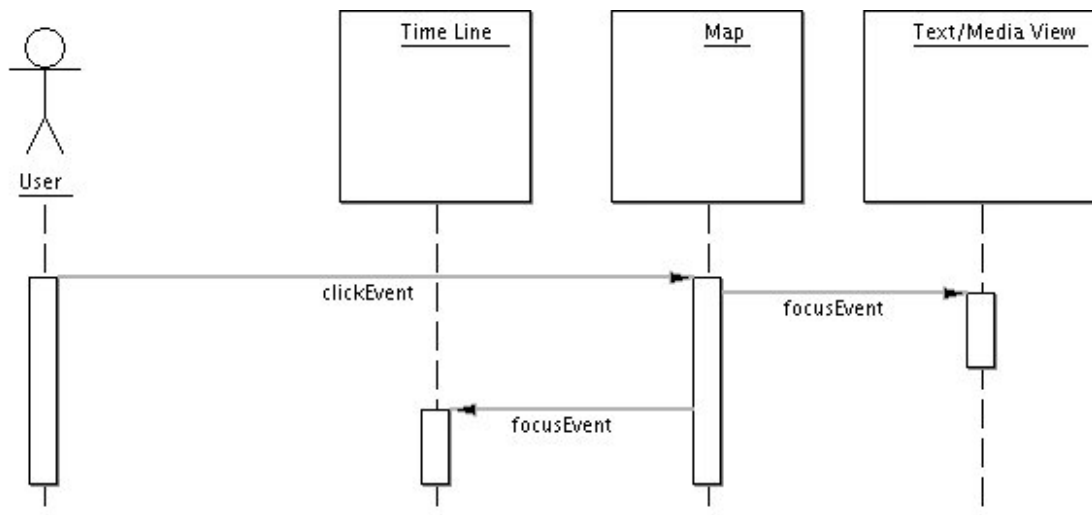

Figure 3.5: The user selects an event in the map.

In Figure 3.4, 3.5, and 3.6 you can see sequence diagrams for each use case.
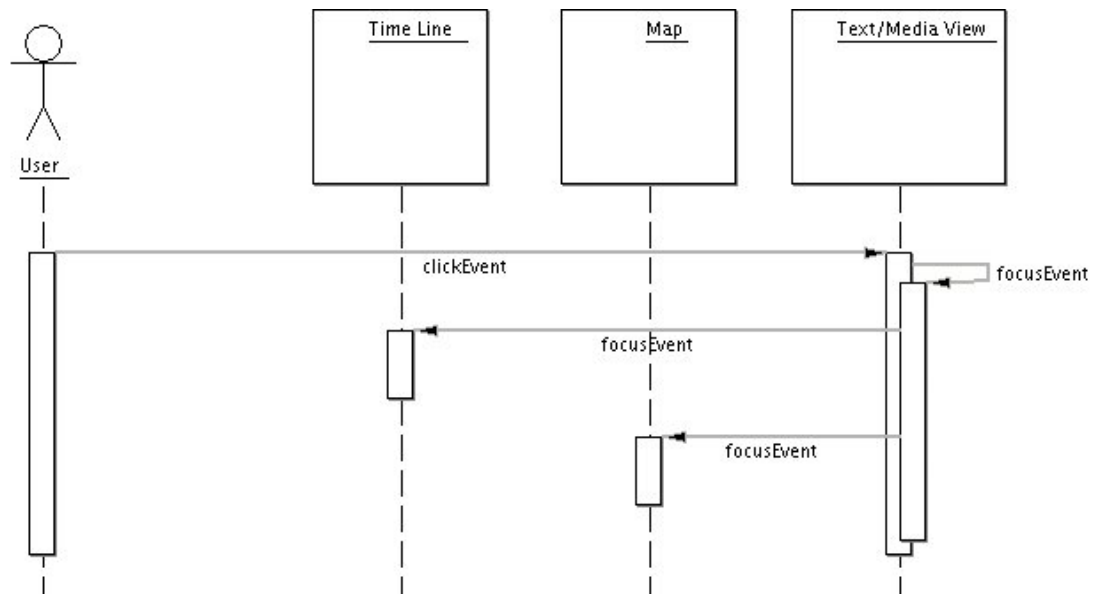
Figure 3.6: The user selects an even in the text/media view.

3.3.2 Components Overview

Several components are in action in Storix (Figure 3.7). On the server side is the database where stories are stored. When the Storix URL is entered into the client, it will be retrieved from the server. When the client code has been loaded to the client, it will send a request to Google Maps to get the Google Maps API and then draw a map. To load a story, the user will need to follow Use Case 1.

The stories are retrieved and packed in XML and sent to the client upon request from the user. This communication is asynchronous, as the web page need not be reloaded and can still be interacted with as the client waits for the story. The whole story will be sent as one chunk. When the story is received on the client side, the client will transform the XML into HTML with an XSLT document that it has fetched beforehand. The story is then viewed in the text and media view, and all events are put into the map and the timeline. Storix is ready for story interaction, and use cases 2-4 can be performed.
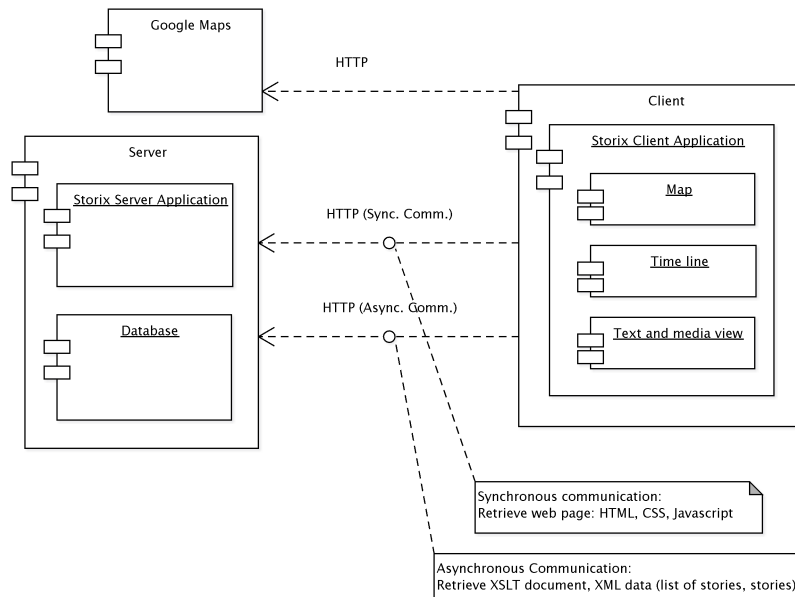
Figure 3.7: Overview of Storix components

3.4 Presentation And Interaction

3.4.1 Time

Creating a tool for navigating time is not trivial. From the use cases already presented, it is clear that a timeline concept has been chosen. This is based on research conducted on various ways of navigating time. I will now present some concepts that have been explored before deciding on the timeline.

Using sliders populated with events is one way of making a navigable presentation of events in time. The AlphaSlider [36], for example, is good for selecting items from a list of alphanumerical data. It allocates its space proportionally based on the number of items that starts with each character. This concept can also be used when handling events in time, by letting time spans with many events have more space than timespans with few or no events. However, even though this is good for arranging items in order, it destroys the feeling of time, as time units do not have equal physical size. Also, it has a finite range, which is limiting if we want to add events real time and the new events are outside of the pre-defined range.

The TimeSlider [37] is a specialized slider for viewing time. It is non-linear, with an exponential time scale at the ends and linear time at the center. It solves the problems of finite ranges by letting the user move any time point in to the range viewed on the slider. In order not to irritate the user by

moving the time scale every time the user drags the slider, it can hold for e.g. 0.3 seconds before moving the scale. Further, a mark is shown for each event, making them easy to locate. However, just as the AlphaSlider, it destroys the feeling of time as they are presented in a non-linear way.

A linear time slider with additional controls, for example buttons or several sliders working together, can solve the problems mentioned above: You could make a slider with linear time with the possibility of altering the range and resolution. However, as more functionality is added to the slider, usage will become more complex. Changing the design completely from the slider concept to a timeline concept will keep the complexity down and at the same time solve the problems of sliders.

A timeline will be limited to a start and stop position of the visible area, but the visible area may be altered by scrolling the timeline back and forth with no constraints. Since there are no final start and stop position, zooming is also easy to implement by simply altering the timespan that is viewed.

One example of a timeline can be seen at the World Explorer web site[8]. Here, the timeline itself can be moved back and forth, and it can be zoomed with a plus and minus button, or with a slider between the plus and minus button. We thus save one set of controls in proportion to the slider, as we do not need dedicated controls for altering the start and stop position. Selecting ranges should not be a problem to implement in a timeline. However, this will not be covered in this thesis.

Another example of a timeline with more details, is the Simile Timeline[9]. This is an open source widget that can be added to other projects[10].

| | 2005 | | 2006 | | 2007 | | 2008 | | 2009 |
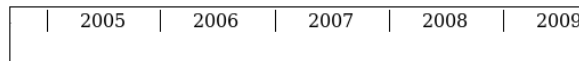
Figure 3.8: A simple timeline.

Presenting time introduces other problems than just how to navigate it. Time zones are one example of this. As mentioned earlier, different time zones can break the context of an event. One way to solve this, is to give both local time and GMT/UTC time for each event. Typically, if a story happens in different time zones, the timeline could show GMT/UTC while local time is shown somewhere else. The timeline could also show both local time and GMT/UTC. I will not go further into this issue, and will regard it as future work.

There are also other issues implementation wise that must be taken into consideration when

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[8] `http://www.world-explorer.info/map.php`

[9] See `http://simile.mit.edu/timeline/`. The example on the web page shows the John F. Kennedy assassination.

[10] It could have been used for Storix, but it was chosen to write a timeline from scratch especially for the Storix project.

creating a timeline. These issues will be addressed in Section 3.8.

3.4.2   Place

A map will be a central part of the interface of Storix. For the prototype, Google Maps has been chosen. The reason for this is the simplicity of using Google Maps in mash-ups (see Chapter 2.1.6). For the proof-of-concept version of Storix, Google Maps gives the functionality needed with a minimum of code. For future versions, other solutions could be considered.

3.4.3   Text And Media

The use of melody/patterns is important when structuring a story. This is important for storage (see Section 3.2), but must also be taken into consideration when creating a user interface for presenting the story.

Two ways of presenting the melody/pattern of events have been identified: the first is showing all events one after another and making the "list" scrollable (Figure 3.9), just like a blog. The second is presenting one event at a time (Figure 3.10). For the prototype, the first example has been chosen. This example is also the one that is reflected through the use cases. Which method is the best, will not be addressed here; this should be evaluated through users testings.
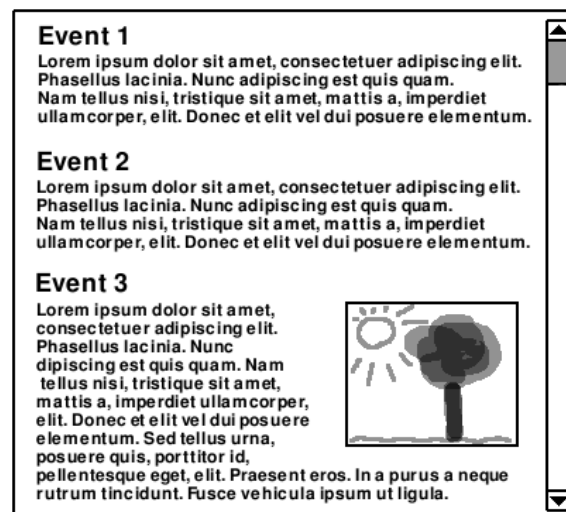

Figure 3.9: Example of a presentation of text and media where the user can scroll up and down.
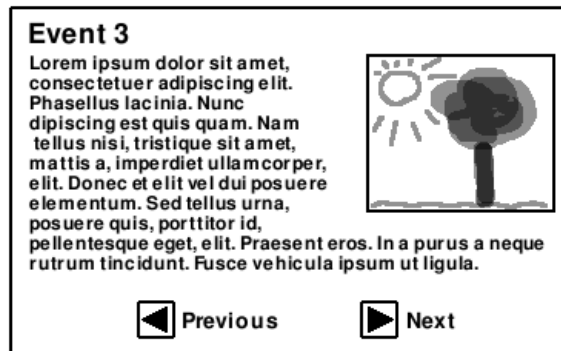
Figure 3.10: Example of a presentation of text and media where the one event shows at a time.

3.4.4   Synchronization

As can be seen from the use cases, there is synchronization between the three components of the view. The idea is to give the user more than one way to navigate the story. Normally, when reading a book, you read text and turn pages. The equivalent in Storix, is to scroll the text/media view. However, as there is a timeline and a map, the user is also allowed to use these as an entry point to the content of a story. By selecting an event either in the map or in the timeline, the other three components of the view will be updated, thus they all show information for the event in focus. Switching between the different ways of navigation is seamless as you can not tell which method was used last time.

3.4.5   Other Issues

Real time updates of the Storix view has been mentioned in the scenarios. This will not be designed and implemented. However, it is possible to achieve some kind of "real time" update as the user can simply reload the story to see if it has been updated.

Also, multiple viewpoints for collaborative stories is a possibility. This can be solved on a storage level by allowing the use of the Dublin Core standard on all content in an event like proposed earlier. In the interface, checkboxes for each author could be made, allowing the user viewing the story to choose which of the authors' viewpoints to be displayed. This will not be implemented at this stage.

3.5   Aesthetics

The aesthetics of a web page is important; after Google got Adaptive Path to redesign Blogger.com, "the end results far exceeded Google's expectations" [38]. To make Storix more appealing, a couple of things have been done.

A complementary color scheme has been chosen. By using complementary colors, harmony is achieved [39]. After a little trail and error, blue and yellow were chosen (Figure 3.12). The brightness and saturation of the two colors were set low for the colors not to grab too much attention. Yellow has been used as the dominant color, while blue is used on details (highlighting of elements, in addition to the sea in the map). In addition to blue and yellow, black, white, and gray have been used. It should be noted that colors in the map (except for the color of the sea) and in pictures are not taken into account when choosing colors, as the map uses a lot of different colors and the use of colors in pictures can not be controlled. However, as the brightness and saturation of the colors used are low, this will hopefully not be a big problem.

Figure 3.11: Yellow and blue have complementary hue.

When it comes to layout, the menu has been placed on the left. To create symmetry, the equal amount of space is "open" on the right side, making the main part of the page (map, timeline and content area) take up 50% of the page[11]. Further, the main part has been divided approxemately in two, with the map and timeline taking up the upper half of the page. Also, rounded corners has been used to make the look easier on the eye (as round edges appears "softer" than sharp edges)[12]. Further, as all monitors do not have the same resolution, and because some people do not like to view web sites in full screen mode, Storix will have a fluid layout that allows it to be resized according to the browser window size.

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[11]The golden ratio has not been used, as this would leave the main area too small.

[12]This is part of the CSS3 standard, and has so far (summer '07) only been implemented experimentaly in the Firefox web browser.
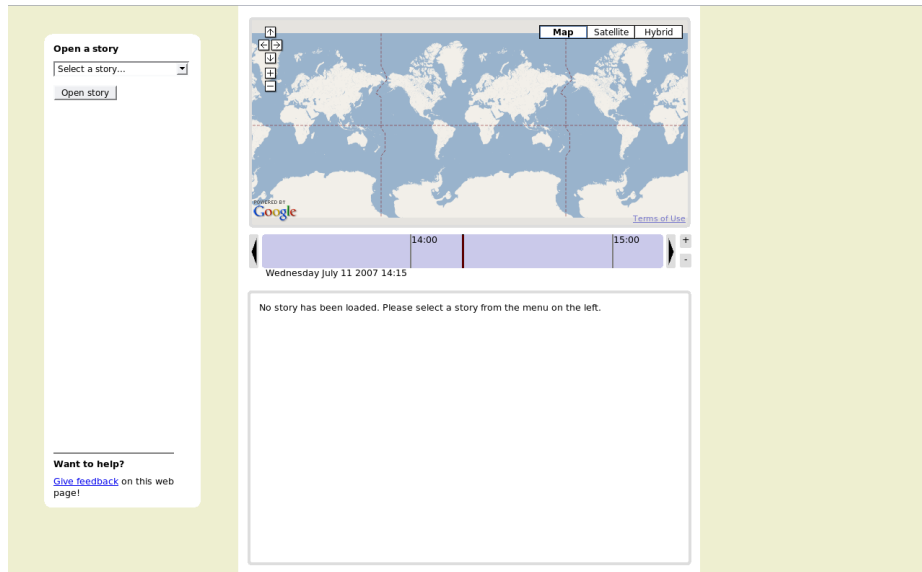
Figure 3.12: A screenshot of Storix

3.6 Technologies

Storix was to be implemented as a highly interactive web page. In this section, some relevant technologies and approaches that have be used to achieve this will be presented. All the software used is Open Source.

3.6.1 AJAX

AJAX is short for Asynchronous Javascript and XML. It is a collection of technologies: CSS (Cascading Style Sheets), HTML (HyperText Markup Language), XML (Extensible Markup Language), and JavaScript, together with the ability to perform asynchronous server requests.

The asynchronous server requests is probably AJAX' greatest asset, together with JavaScript's access to the DOM Tree[13]. This allows web pages to be updated real time, without having to reload the whole web page: The web page can fetch data from the server in the background and update the view when the data is received. The user need not wait for the update and can still interact with the page, in contrast to the old static web pages were the user would have to wait until the whole page had been reloaded. With asynchronous requests, smaller chunks of data is normally retrieved, and the overall response time of the web page will be highly reduced, making the web pages react

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[13]The DOM Tree is a hierarchical structure of all HTML elements in a web page, and it is accessible to JavaScript so that it can be changed on the fly

much more like a desktop application. Further, as the JavaScript can change elements in the DOM Tree, techniques like e.g. drag and drop can be implemented in the web page. JavaScript will be the client side programming language.

3.6.2 Ruby on Rails

Ruby on Rails is a rather new concept which has gained much attention through the emergence of Web 2.0. Ruby is a programming language that is not restricted to web servers, but with the introduction of the Rails framework, it has become highly suitable for web applications.

The Rails framework is written especially for web development. It implements the MVC design pattern and has a lot of web specific functionality, in addition to code that is able to auto generate trivial functionality like e.g. user handling.

AJAX functionality is also part of the Rails framework. The programmer can write Ruby code that will be automatically converted to JavaScript. However, in the case of Storix, this possibility has not been utilized. Ruby on Rails will be used as the server side programming language.

3.6.3 XSLT

XSLT is used to transform one document type into another. The typical usage is to convert one type of XML document into another, for example an XHTML document. The XSLT document is an XML document itself.

In Storix, XML will be used for data that is being transmitted between the server and the client (List of stories and the stories themselves). XSLT will be used on the client side to transform the stories from XML to HTML.

3.7   JavaScript Libraries

JavaScript if often blamed for causing a lot of problems for web developers. However, the problem is most often not JavaScript itself; rather it is the different browsers' implementation of the DOM three that causes difficulties. To reduce the number of such browser related issues, two JavaScript libraries have been used in the implementation of Storix: Prototype and Sarissa.

Prototype[14] is a framework that aims to make the development of dynamic web applications easier. It contains code that abstracts away browser differences, for example when doing Ajax

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[14] `http://prototypejs.org/`

operations. It also has a lot of shortcut methods, for example "$()" which is short-hand for "document.getElementById()". By using the Prototype library, one can concentrate more on solving the actual problem instead of figthing with browsers that behaves differently.

Sarissa[15] is also, like Prototype, a framework that abstracts away browser differences, making a number of operations easier. It focuses on XML and has been used for the XSLT transformations in Storix.

3.8   Timeline

The timeline described in this thesis is a component based on HTML, CSS and JavaScript. It makes it possible to scroll back and forth and to zoom in and out of time. In addition it allows the visualization of events in time, as events can be plotted on to the timeline.

Creating an interactive component like this is not straight forward. One has to use pre-defined HTML elements that are originally made for other purposes. The timeline is made with Storix in mind, but is written to be as general as possible, making it possible to use it in other settings without much effort. How to implement the timeline, and which HTML components to use, was not an easy decision. Two different versions of the timeline have been implemented to try out different approaches.

3.8.1   First Implementation

The first implementation of the timeline consisted of a div-box that functioned as a container for the timeline. Inside the timeline, there were two new div-boxes. These were movable; when clicking and holding a mouse button and then moving the mouse, the div that the mouse was pressed on would move according to the mouse movements. When one of the divs was moved, the other div would follow it.

The reason for using two movable div-boxes, was to create an impression of an infinitely long timeline that could be scrolled in both directions without any start and stop position. This was done by creating the two divs a little wider than the container (so that one of them could completely fill the container) and swapping the divs (see Figure 3.13) when one of them was moved outside of the container. The content of the div that was swapped would have it's content re-drawn. The two divs contained small boxes that each represented one time unit (for example an hour or a year). These

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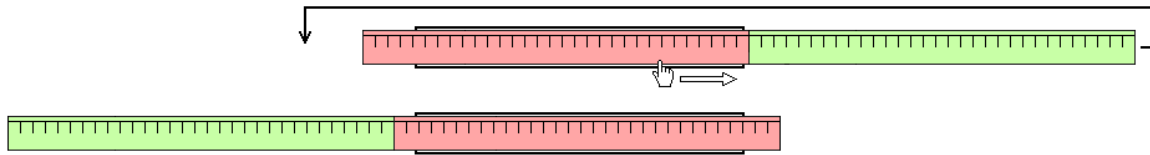
[15] `http://dev.abiss.gr/sarissa/`

Figure 3.13: Shows the old concept of the timeline. It consists of a main div, containing two moveable divs which swapped place when moved outside of the container div. Time was visualized by using a table inside each of the moveable divs. The parts of the moveable divs that is outside of the container are hidden in the implementation.

boxes were drawn as an HTML table, with each table cell representing one time unit. This approach resulted in some problems.

Knowing the center time of the timeline is crucial in order to make the timeline perform actions: For example, if an event is dragged past the center, one would want something to happend. When the timeline had been implemented this turned out to be very inaccurate. The reason for this inaccuracy was that the width of table cells could not be accurately specified, making calculations difficult as they were based on the width of the cells. In order to specify a table, you need to specify the total width that it is allowed to use (in this case, the width of it's parent div). When this area is then split into cells, the hosting browser will adjust the width of each cell so that they together will fill the total area. As there are only a number of pixels available on the screen that the cells can be drawn into, each cell will not be of same width; the given width only works as a guide for the browser. How wide the cells actually becomes, are influence by several factors: how many rows are used, font size, text length and text alignment were all found to influence this. To solve these problems, a monospace font could to be used, and each cell needed to have the same number of characters (at least if text was centered). One could also read out the width of each and every cell after they had been drawn and do calculations from these data.

To further complicate the implementation, issues like the number of days in a months that were drawn on the timeline and whether or not it was leap year had to be taken into consideration (see Chapter 2.1.6). This was caused by the fact that several time units had to be drawn at a time.

The result of this first implementation was a fully working timeline, however not very accurate. It was also rather complex and not very responsive as a lot of code had to be executed when moving the timeline. Particularly when the two divs were swapped, many calculations had to be carried out, affecting the smoothness of movements. Instead of refactoring the code and solving all the problems, another (both better and less complex) approach was attempted.

3.8.2 Second Implementation

The second (and, to this point, final) implementation of the timeline also makes use of a container div, just like the first implementation. However, instead of using two moveable divs that can swap place, several divs are used, each representing one time unit. When one div is moved "outside" the container, it is deleted. A new div is created in the opposite end of the timeline (Figure 3.14). By doing this, the timeline need not worry about issues like leap years and different number of days in a month when calculating: The timeline will know which time unit which is in center (based on the width of each div, which will be accurate as each div's width are independent of all other elements), and can do the calculations based on this instead of calculating over longer time spans.

Figure 3.14: The new concept. Several divs are used to visualize time; one div represents one time unit. When moving one of the divs, all the others will follow in the same direction. When a div is moved outside of the container, it is deleted and a new one is drawn in the opposite end of the container.

On control level, the timeline consists of a linked list. Each link in the list represents one time unit in the timeline, and has a reference to one div. When moving the timeline, the user is in reality only moving one div. As this div is being moved, it will call on its neighbour divs (one on each side) to tell them that it has been moved. These calls will traverse in both directions, as each div is responsible for calling its neighbour. By doing this, there is no need for any central control of what is going on. Each div is responsible for moving correctly according to the other divs.

The div that is moved by the user is also responsible for deleting any div that has been moved outside of the container, and to create new divs in the opposite end if needed. The new divs, once created, will be responsible for drawing themselves in the correct place.

The second version of the timeline has one function that the first version does not have: It is possible to mark events on it. The events is also represented by a linked list, and each link in the linked list of time units is responsible for picking the events that "belongs to it" from the list of events and then draw the events on its div.

To make the timeline interact with other elements (for example a map), it is made so that when toggled by the user, it can execute a chunk of code specified by the user/developer (in the timeLineUpdated() method).

It should be noted that simultaneous events are not supported, neither is different time zones. Further, the code is not optimized in the prototype.

3.9   Map

There is not much to say about the map implementation as Google Maps has been used. Only a container div, a few lines of JavaScript code and a Google Maps API key was needed.

In addition, custom color markers have been made for the map: a red one for events not in focus, and a green one for focused events. The synchronization code changes the markers when an event is focused.

It should be noted that Storix do only support location points at present time; support for areas or curves has not been implemented.

3.10   Synchronization

Synchronization between the text/media view, the timeline and the map has been implemented. This is handled by the focusThisEvent() method, which needs to know the id of the event to be focused. It also needs to know whether it was the timeline, the map, or the text/media view that was toggled. It is then responsible for updating the other elements to focus on the event that has been selected.

In the scenarios, real time updating of the interface with new events is mentioned. This has not been implemented. However, if the person uploading the story changes anything and the story is being reloaded, the changes will be shown.

3.11   The Story

The story is saved in a MySQL database on the server. When the client asks for a story, the story is looked up in the database and wrapped inside an XML document. This document is sent to the client, where it is transformed to HTML with an XSLT document.

In the prototype, the whole story (including the track) is sent to the client in one XML document. This might not be a good approach as one has to wait for the whole story to be loaded before it can be viewed. This may be solved by doing two asynchronous calls to the server, and handling each of them when results are returned. The drawing of the track should be performed in several steps with a timer so that it does not lock the browser while it is being drawn[16]. Further, if Storix in the

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[16]JavaScript does only support one thread, thus operations that uses a lot of time locks the browser. By using a timer and creating "interrupts" once in a while, other operations can be executed too, and we do not risk getting an "unresponsive script" error.

future is implemented by showing only one event at a time (Figure 3.10) instead of a list of events (Figure 3.9), one event could be loaded from the server at a time.

Recursive episodes have not been implemented. Further, no namespaces has been implemented, neither in the code nor in the XML documents. Dublin Core are not used in the prototype.

3.12   Interface

As monitors may have different resolution, and because some people do not like to view web sites in full screen mode, Storix has been made to resize when the browser window is resized. This is done by giving values in percent instead of absolute values, which automatically makes the site resizeable. However, the timeline needs absolute values for it to work properly. This has been solved by detecting when the browser is resized, and then redrawing the timeline.

The resizing does not apply to font size. However, these sizes are given in em instead of pixels, which allows increasing and decreasing the size of the text. The use of absolute values (pixels) has been kept to a minimum, but is used in a few cases that do not affect the resizing in a major way.

3.13   Browser Compability

Storix does only support Firefox[17], and to some extent the newer versions of Opera[18]. The focus has been on concept, not on browser issues. However, means have been taken (for example by using the Prototype and Sarissa JavaScript libraries) so that it should be possible to make Storix work in other browsers as well without having to rewrite all the code[19].

3.14   Tool For Creation of Stories

The tool for creating stories has been chosen to be as simple as possible. It does not help producing the data: this must be done with e.g. a GPS, mobile phones, cameras, pens and paper. However, it should assist the users in uploading and organizing their data. It must therefore reflect the structure of Storix stories. It should consist of:

- One page for creating stories, where it should be possible to:

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[17] `http://www.mozilla.com/firefox`

[18] There are some bugs in Opera: Some times the site does not render correctly, and there are some layout issues in the timeline.

[19] Note that not all browsers support XSLT.

  – Name the story

  – Upload a track for the story

- One page for adding episodes to stories

- One page for adding events to episodes

- One page for adding media and text to events

Figure 3.15: A Bluetooth GPS and a telephone, saving a track. A simple Python script read data from the GPS and saves the required NMEA strings in a text file for Storix to use.

Ideally, the system should find the timestamps of the various content objects in an event (text, pictures, etc.) and automatically connect them to location. This will not be implemented as it is difficult to get correct time stamps from, e.g. texts as the timestamps may change if the text has been edited or copied. Further, not all systems handle time stamps in a similar way. These issues should be regarded as future work. In order for the system to be able to connect events to locations, the user will have to select a location manually through a map when the user adds media and text. Available locations can be searched for by giving the system a time interval. This, however, causes one problem: an event is connected to a point, and this becomes problematic if the GPS has not saved a point at the exact time of the event, or if there are more events happening during a period than there are GPS points. This typically happends if the GPS is in a mode where it saves points

based on movement, for example every tenth meter. When this happened during testing, we had to manually create "fake" GPS points in the track to solve the problem. Another limitation is that episodes and events have to be added in the same order as they have happened; the interface does only allow insertion at the bottom of the list of events.

In this chapter, the Storix design and development have been presented with scenarios, use cases, and implementation issues. The prototype is available online, and can be found at `http://asia.hiof.no/stories/storyteller/public/viewer/`. It is mirrored at `http://stories.scesoh.com/`. The next chapter deals with the explorative testing of the Storix concept.

1: Add text to event

Texts already in this story:
Karianne   Destroy
New text...

2: Add pictures to event

Pictures already in this story:
holleby kirke Destroy
New picture...

3: Find time and place for this event/connect to point

Time (YYYY-MM-DD HH:MM:SS): 2007-02-15 09:16:09   +/- 10   seconds Find points

4: Set time and place for this event

Time: Thu Feb 15 09:16:09 +0100 2007
Latitude: 59.32425
Longitude: 11.0931666666667
Id: 8958   Save this point to event

Done!

Figure 3.16: The web page used for adding content to an event in a Storix story.

Chapter 4

Concept Exploration

Part of the research objective for this thesis is to investigate if the use of augmented stories are useful or not and to which applications such stories might be of particular avail or interest. An experiment where real users have been involved in testing and evaluation has been conducted. The following chapter discusses this experiment. First, the ideas of explorative design and testing are presented. This is followed by the method applied. Finally, the three stages of the study itself, alongside its findings, are presented.

4.1   What is Explorative Design and Testing?

An explorative design and testing process is much like other iterative and incremental development processes [40]: One need to understand what to make, implement, and test, and then evaluate the results from this testing. After evaluation, one has hopefully reached a higher level of understanding which allows the making of a better prototype to be created and further tested. What is especially important about explorative design and testing is that it involves real users in the exploration of a concept. They are involved in the process of redesigning and developing the concept and the product to make it better suited for their needs. As the concept is new, it has not been explored before, and it is therefore necessary to be open for changes in both practice and of the product itself. Therefore one should be open for new ways of using the product and new forms of working.

Several different techniques are used in software development to collect data from users during testing, both quantitative and qualitative. Examples are questionnaires, interviews and observations. They can be used in different stages of the process to ensure that the software satisfies the users' needs and allows the users to focus on their work. In the following section, I will get in to the

method used here.

4.2   Method

The design experiment has been divided into three main steps: First, a pre-test was carried out to eliminate any faults that could cause problems for later testing. The pre-test was followed by a phase which tried to connect the concept with practice. In this phase, we tried to find areas of usage, to let the users understand the concept better, and develop an ownership to the concept among the users. The third step dealt with testing of the prototype in real context with real users; this involved both the creation and the presentation of stories. These three main steps were followed by a small usability test of the timeline interface.

4.2.1   Pre-Testing

The initial step of the explorative testing was a pre-test of the prototype. As the prototype was to be used in field testing, the purpose of the pre-testing was to make the user interface of Storix more user friendly, get rid of any design faults that could potentially cause problems for the users at a later stage, and to capture bugs; simply put, to help prepare the prototype for later testing. It was not meant to make the user interface "perfect" (in which case, for example usability testing, should be used).

The test itself was done by letting a number of people use the prototype and give feedback. The prototype was set up on the web together with a link to a questionnaire that the users could fill in.

Questionnaires consist of questions with a number of pre-defined answers or alternatives to choose from. They are well suited for getting specific information, and it is an easy way to reach many people with low resources. However, the pre-defined answers might limit the amount of information that is received, thus a lot of important information may get lost as the user do not have the chance to elaborate or explain their answers. Problems may also arise if there are ambiguity or if the test person misunderstands the questions. As an effort to avoid these problems, each question was supplied with a text field in addition to the pre-defined answer, to let users elaborate on their answers or make comments. This way, it was possible to capture more information than a simple questionnaire would allow, as well as extract quantitative data.

When the questionnaire had been online for some days, the answers were collected and analyzed. The prototype was improved based on the findings.

4.2.2   Connecting Concept With Practice

It is assumed that storytelling is an important tool in education. Therefore, to connect concept with practice, a focus group of students was used. Some of them were only part time students, working full time as teachers in addition. This allowed them to involve their pupils when they were to test Storix at a later stage. To find out more about these teachers, and their thoughts about Storix, a group interview was conducted.

The group interview with the focus group was set up as a semi-structured group interview. This was found to be the best way of collecting information in this case, as the goal was to find out more about the user group and explore how they felt about the ideas behind Storix. Questions had been prepared beforehand, and each question was asked to the group as a whole. Everybody was allowed to answer and elaborate on each others answers. The whole session was captured on video so that the focus could be on the discussion itself, not on taking notes. The video was later transcribed and analyzed.

During the group interview, the focus group was asked about the following:

- Their pedagogical goals and thoughts about participating in the project
- In what type of situations they felt working with Storix could be useful
- How they thought the storytelling tool could be used in education, focusing on the time and place aspects
- What types of stories they felt could be told with this type of tool
- Whether it would affect the impact of the story on the class by the fact that the class had made the story themselves, not only read it in a book
- Whether presenting the story real time would be better than editing it first and then presenting it
- What the groups that already had made stories had experienced.

From these questions, the users were to better understand the concept and get a feeling of ownership to the project. Through discussion, we were to find areas of usage. In other words, we were to reach consensus, agree about the objectives, and reach new knowledge that could be utilized in the further process.

4.2.3   Field Testing

The focus group interview resulted in cases that could be tested with Storix. Three groups of pupils from different classes were involved in this testing, and they were observed in the different stages

of usage.

Observation involves watching and listening to people [41]. It is a good technique for collecting qualitative data that is difficult to get by asking questions. It is not always easy to describe with words what we do in a situation. Sometimes we are not even conscious about what we are doing. Also, in "new" situations, for example when using software for the first time, it is difficult to predict how people will react and behave.

To collect the data, notes, audio, cameras, and video may be used. Notes require least equipment, but important information may get lost. On the other hand, video recording may produce huge amounts of data to analyze. Video recording may also feel intrusive to the users.

Observations can capture things happening "in the wild", for example the observation of pupils in a class on a normal school day. It may also be used in laboratory-like settings, for example in usability testing. Letting users try out a prototype may be a good way to see if the idea behind it is valid in the environment it is meant for. By adding more structure to what the users are doing, an observation session may become a usability test.

Observations may be time consuming and may produce enormous amounts of data to be analyzed. However, it is necessary to understand users and how they behave.

Two rounds of observation were conducted in this study. The first one was the the creation of stories. The second was an observation of Storix in actual use by pupils. In this last observation, the pupils were observed when experiencing the stories that they had made through Storix.

Observation of Story Creation

To get an idea of how the pupils would work together to make a story, observation of one of the participating groups was carried out. This was done by simply being part of the group, walking together with them and looking at what they were doing and how they were doing it. Pictures were also taken.

The purpose of this observation was to see how the pupils would work when creating a story. Seeing this work in practice would make it easier to understand the pupils and teachers when the pupils were to use Storix at a later stage.

Observation of Storix In Use

After the pupils had made a story, they were to experience it through Storix. Observation of Storix in use was done by visiting each of the three participating groups and letting them try Storix.

The groups were split into smaller subgroups, typically with pupils who had worked together. In Rakkestad, these subgroups consisted of 3-4 pupils. At Kurland, each group consisted of 2 persons.

These groups were simply put in front of a computer and asked to use Storix with no explanation, except from that they were to see the story that they had made. They were left to discover by themselves how to use Storix, but were given small hints and clues if they spent much time without trying certain functions. In addition to this, they were asked questions while using Storix, both about their experience of using it and about how they had made the story and how they felt about it. Thus, this observation became a crossing between observation and a group interview.

These sessions were captured on video, and the dialog was later transcribed and analyzed. Using a camera for capturing users is always a dilemma because it is difficult to know how much the presence of the camera influences the users behavior. However, studies have shown that users get used to this situation fast and that it may not have a big influence [42]; the camera "quickly becomes a proverbial 'piece of furniture' that nobody pays much attention to" [43]. Besides, since this study was not about capturing their everyday behavior it may not be regarded as a problem if they were influenced by the camera.

The observation of Storix in use had two objectives. The first objective was to see how end users would use the storyteller tool and how they reacted to being told stories this way. Did they recognize the story? Did they react negative or positive when seeing their story through the storyteller? Did they want to edit the story? Was it fun? Part of this was also to capture their reaction to seeing the story that they have been part of creating, and if they felt ownership to it.

The second objective was to identify how the users interacted with the story through the software. How long did it take before the pupils started using the different ways of navigation? Would they use all the different ways of navigating through the story (timeline, map, focus links in text)?

4.2.4 Usability Testing

As an additional experiment, a small usability test was conducted to test one specific thing: what way should the timeline move when clicking the arrow buttons that it is supplied with? This is only one aspect of the design that could be tested, and may serve as an example of how user testing can be done. In this particular case, the test was performed by setting up a timeline in a browser, together with questions about the timeline and its behavior.

4.3 Pre-Test

The pre-test consisted of Storix set up together with a questionnaire that was implemented as an online web page[1]. The group answering the questionnaire was gathered by asking random people to try Storix and then give feedback; the link to the questionnaire was posted on a design feedback forum[2] on the web and also distributed to various of the authors friends and contacts.

None of the users were told how to use the web site or given any training. They were simply told what it was about and left to find out by themselves how to use it. Only one story was made available for them to test.

The questionnaire consisted of three main questions that could be answered by checking the option that suited the user best. In addition, text fields where the users could elaborate their answers were provided. The users were also allowed to write more generally about what they liked and disliked and if they found any bugs. They were also allowed to leave any other comments if they wanted.
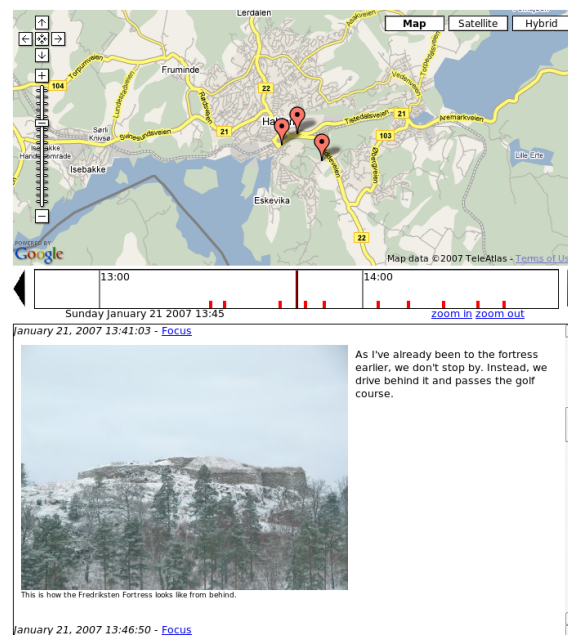

Figure 4.1: The first prototype. This was made available together with the questionnaire

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[1]The questionnaire can be seen at `http://stories.scesoh.com/feedback`

[2] `http://www.hallwaytesting.com/`

Table 4.1: How the users felt about using Storix

	Yes	No	Unsure	Total
Ease of use	14	0	3	17
Reading a story?	12	0	5	17

4.3.1 Results

In total, 17 persons answered the questionnaire. As the questionnaire was anonymous it is difficult to create a profile of the users. However, based on who was given the link, where it was posted and the feeback that was received, it is estimated that approximately 11 of the 17 users can be considered expert users; they have taken courses that focuses on design and usability or are above average interested in web design and usability. The remaining users were not expert users.

The number of people answering the questionnaire was not overwhelming. One reason for this may be lack of browser compatibility[3].

As mentioned earlier, none of the users were told how to use the web site, they were simply told what it was about and left to find out the rest by themselves. Most of the users caught the concept by themselves, but a couple of users had problems grasping the concept of Storix.

In the subsequent sections, the results of the pre-test will be presented. This is followed by a look at the actions taken to improve Storix.

Userfriendliness

The users were asked if they felt that Storix was easy to use. As can be seen in Table 4.1, the majority of the users felt that it was easy to use, while none of the users felt that it was difficult to use. Three of the users answered that they were unsure.

When elaborating the answers, two users noted that they did not understand the connection between the three parts (map, timeline and text) in the beginning, but that they found out about it after a short while without any help. One user wrote that the design should be more intuitive. Another user thought that the purpose of the site was unclear. However, the thing that most users noted was that there should be a stronger visual connection between events in the timeline, on the map and in the text field (4 users stated this). Using the same colors and icons on each event was suggested. Further, "stronger" synchronization between the various elements on the page was

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[3]Storix did only support Firefox at the time when this testing took place, and Firefox had below 27.8% [44] market share. Nevertheless, the majority of users used other browsers than Firefox.

Table 4.2: How the users interacted with the timeline

Dragged	Arrows	Both	Did not understand	Did not try	Total
5	2	9	1	0	17

mentioned, i.e., the ability to click an event in the timeline to center it without having to drag the timeline. Another suggestion was to remove the text bubble appearing in the map when clicking an event. Lastly, it was suggested that the timeline and text should be updated when panning the map.

The answers from these questions indicates that there were no major flaws in the design concept of the web site. However, it pointed out several details to be fixed. It suggests that some general information about the concept should be available to users who happened to stumble upon the site.

Feeling of Being Told a Story

The users were also asked whether they felt they were reading a story or not, and also to elaborate on why or why not. The results can be seen in Table 4.1.

12 of the 17 users had answered that they felt they were reading a story. The five remaining users were unsure. The users that were unsure seemed to have been supplied with too little information beforehand, so they did not know what to expect. One of them was from London and could not read the Norwegian text[4].

Interaction With Timeline

The second question, "How did you move the timeline", was answered by everyone. As we can see from Table 4.2, all 17 users interacted with the timeline. However, the way they interacted with it varied: some dragged it, while others used the buttons. One user did not understand that the timeline could be moved.

When elaborating on this topic, one thing mentioned was how the timeline moved when using the arrow buttons. They felt that it moved in the wrong direction. This was mentioned by 4 of the users, which makes up one third of the 12 users that used the timeline.

These answers suggest that the timeline concept were understandable, but that some actions can be taken to make the different ways of navigating it more clear.

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[4]The story was translated to English at a later stage

Other Comments From The Users

The users were also asked to give general comments and problems. One of the major problems reported, was that the layout was fixed. This meant that on some computers, the user interface required more space than was available on the screen. The result from this was that everyone with a screen resolution below 1280x1024, who did not maximize the browser window or who had many toolbars installed in the browser would have to scroll up and down to interact with the map and the text.

Another problem reported, was that on some computers, Firefox reported that an "Unresponsive script" was running and asked the user whether he would like to continue or to stop it. This problem especially occurred on Linux computers, but also on slower Windows computers. There are two things that seemed to trigger this error. The first was when loading the tracks and drawing them on to the map. As a track may consist of a huge number of track points, it simply took too long to draw them all. The other situation where this error message occurred, was when scrolling the timeline. This was caused by the way the script was checked what to update each time the timeline was dragged. The code was not very fast, iterating through all events[5] to check their status on each mouseevent. Naturally, this caused a lot of iteration and hence problems occurred on slow computers.

The last problem mentioned was that the focus links in the text only worked once per event. One had to focus another event first in order to re-focus the event that was clicked last, even if the event was scrolled out of focus.

There were also other details that were commented on: the design should be prettier, elements on the page should be re-arrangement, holding down the left mouse button on one of the timeline arrows should move the timeline continuously, clicking an event on the map should move you directly to the event in the text, and the timeline without opening a "bubble", and lastly, integrating thumbnails in the timeline and on the map.

4.3.2 Changes Of Design

Several actions were taken based on the feedback gathered through the pre-test. These actions dealt with bugs, usability issues and graphic design. In this section, the main actions taken will be presented, starting with how to deal with bugs and other problems.

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[5]There are two types of events here. One is events in a story (e.g., "we found a house in the forest"), the other is software events (e.g., a mouse event)

One of the problems reported, was that the content on the web page did not fit the screen on some computers. This was solved by changing the web page from a fixed layout to a fluid layout. This means exchanging most values given in pixels (px) with values given in percents, allowing the page to scale up and down relative to the size of the browser window (see Figure 4.2). This ensures that the site is viewable on a wide range of screen resolutions, and it is also possible to use the site when the browser is not maximized; it will shrink and grow as you resize the browser window.

Another problem reported, was that Firefox reported that an "Unresponsive script" was running. This was fixed temporary by not drawing the track on the map. In addition, the code that synchronizes the various parts of the web page (map, timeline and text) was refactored. A timer was also added to create a short delay every time the updating function was called, resulting in it being called less often.

As for the timeline, several things were done: Clicking and holding the mouse on the arrow buttons now scrolls the timeline continuously. The direction that the timeline moves when clicking the arrows was also switched[6]. Also, the zoom links under the timeline where replaced by a plus (+) and a minus (-) button that is more "integrated" in the timeline.

Another change applied to the timeline, was creating a design encouraging the users to use it. A hint that it could be interacted with were introduced by changing the background color when hovered by the mouse. Also, the mouse cursor was made to change when the timeline was hovered.

There were further introduced a clearer connection between events in the map, the timeline and the text. The event in focus is now marked with green, while all the other events are red; in the first prototype all events were red. In the text, the event in focus is highlighted, while text for other events are gray. Also, the text bubble showing an excerpt of an event text in the map was removed, causing a direct focus of the event when being clicked in the map.

When it comes to graphical design, the interface was updated with a complementary color scheme and rounded corners on all boxes[7]. These changes can be seen if you compare Figure 4.1 and Figure 4.2. Another design grip taken was to only allow images at the left side of the text box instead of on both sides to make the layout cleaner.

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[6]A separate test, described in Chapter 4.7, was conducted regarding this issue

[7]Rounded corners only works in Firefox at the moment. This is part of the CSS3 specification, and is only implemented as an experimental feature in Firefox and WebKit `http://www.css3.info/preview/rounded-border.html` (WebKit is not supported by Storix)
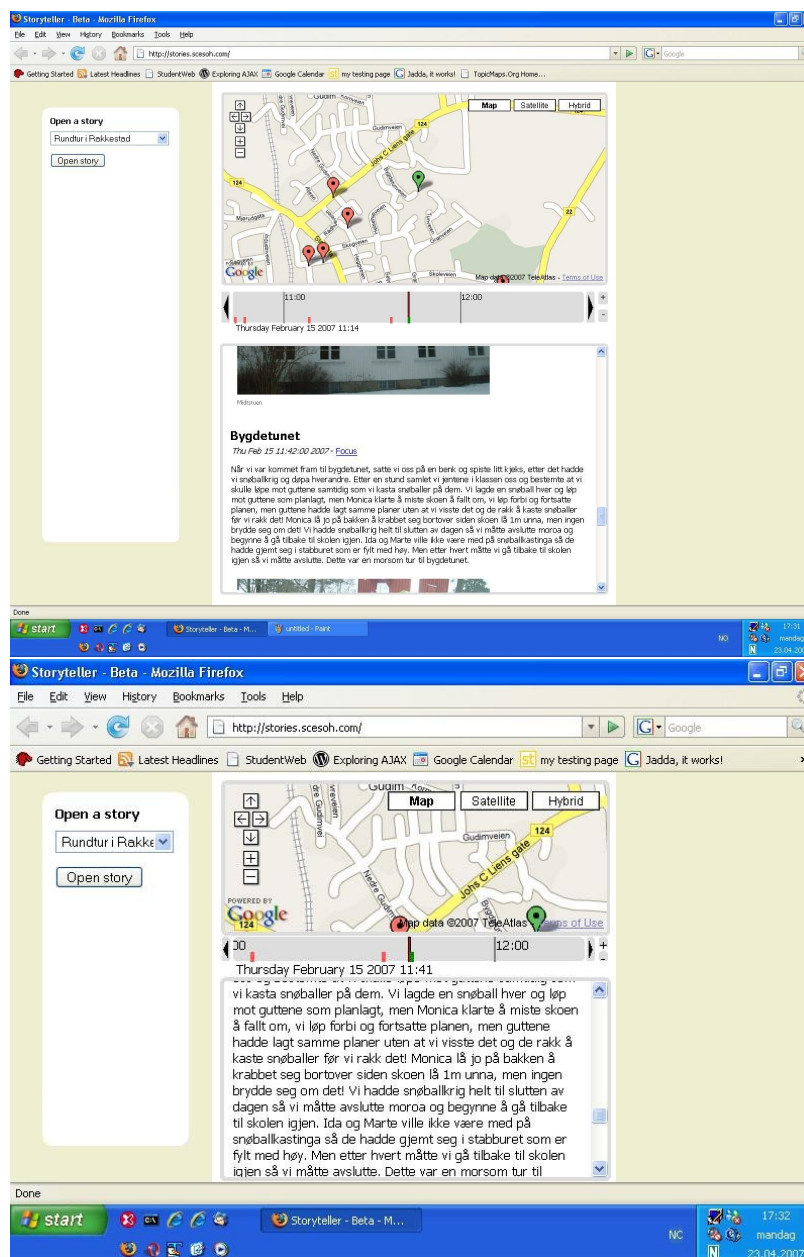
Figure 4.2: Storix on a screen with 1280x1024 (top) and 800x600 (bottom) resolution.

4.4 Connecting Concept With Practice

In the second step, connecting concept with practice, a group of 6 teachers were gathered. They were later participating in the field testing. All of them were volunteers taking the ICT for teacher's

course at Østfold University College at the time being and chose to be part of this project (i.e. the Storix project) as one of their assignments. Being part time students, working as teachers during the day, they could involve their pupils in the testing, resulting in a total of about 30 pupils from 5th to 8th grade engaged in the project.

The process of connecting concept with practice was done by conducting a group interview. At the point when the interview took place, the users (teachers) had already been introduced to the prototype of Storix. Some of the users had been out "in the wild" with their pupils collecting data for a story, but not all of them.

It should be noted that everybody in the group came straight from a full work/school day and were tired, which might have affected the interview. Following is an analysis of the transcript (see Appendix A.1).

4.4.1   Analysis of group interview

The Teachers Goals Of Participating

In the Norwegian school today, a reform called the Knowledge Promotion (Kunnskapsløftet in Norwegian) is being realized. It took effect from autumn 2006 for pupils in grades 1-9 in 10-year compulsory school and for pupils in their first year of upper secondary education and training (i.e. the 11th grade)[8]. The Knowledge Promotion includes Information Technology as one of its topics. The participating teachers saw this as a golden opportunity to start a larger project with information technology in focus (which they felt they should arrange anyway). The teachers feel that it is cumbersome to start such projects because of schools lack of IT tools. One of the teachers mentioned that there were several parts of the Knowledge Promotion she could cite from where this project could be useful, especially within Information Technology, but also in relation to other parts.

The teachers also saw this project as a way to motivate their pupils. It was something new and exciting, and they would be allowed to carry their mobile phones to school, something that they were not normally allowed to do. The outcome would become something that the pupils could look back on later, and also share with others.

As already mentioned, the teachers saw that Storix could be used as a tool in many subjects. The next section will look more in to general usage of Storix in schools.

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[8] `http://www.regjeringen.no/en/dep/kd/Selected-topics/andre/`
`Knowledge-Promotion.html?id=1411`

Usage

The teachers saw two main areas where this tool could be put to use in schools. One was to document events in the pupils lives. The other was to recreate events where the pupils were not participating.

In the first area of utilization, the typical usage envisaged by the teachers was to document an excursion or other events that the pupils would take part in at school, and also on their spare time: football trips, school camps, documenting local wildlife, documenting a skiing trip, and creating reportages. Another related area of utilization mentioned was to create fictional stories and stories consisting of both fact and fiction, for example a fictional story based on real events: "What would have happened if we did this instead of that?"

In the second area of utilization, the teachers envisaged that the pupils could recreate parts of, for example, the Viking Age. This could be done by collecting text and images and place them in time and space. By doing this, the pupils would learn how to search and gather information. The teachers thought of this way of learning as more fun for the pupils than reading a book.

In both areas of utilization, there are many subjects where Storix could be useful. Subjects mentioned were Norwegian, gymnastics, nature studies and science, social studies, and information technology, in addition to using it for interdisciplinary projects.

One subject the teachers pointed out for use in Storix was writing. "One of the five factors that a pupil should master, is the ability to express himself both orally and in written form" one of the teachers said. The pupils ability to gather information, document events, and then express themselves could be part of the story creating process too. "[...] we achieve process-oriented writing when they can go through the text afterwards and get feedback and change it. [...] With a computer, they can edit, remove, and add text. One of the pupils has big problems with writing, but not with expressing himself." A natural consequence of this is that the pupils also learn how to use the keyboard on a computer.

The Idea Of Working With Stories

According to the teachers, stories are part of our lives from we are young, and they look at Storix as an extended type of story that can be helpful for their pupils.

Since the pupils participate in creating the stories, the teachers believe that they will get a stronger belonging to the story. Like one of the teachers said: "You feel that the story belongs to you, it's not just a factual text, it becomes something that you have been part of and can tell of. It's not just describing a place." Another teacher were more straight forward: "[The story] becomes

yours".

The teachers think that the process of creating the story will help the pupils remember better, as they have been part of the events; they were there and experienced it all themselves, or they have put together the content of the story (for stories that are reconstructions of earlier events). The pupils will probably concentrate more on the task when writing, as it is possible for others to see the story afterwards. The editing process will also improve the learning as they get to repeat the material when they continue working on it. One of the teachers said that "It is another way of thinking. Often, when I'm working on an assignment, I write just to get finished. [Here,] you must give more of yourself, and it becomes more interesting. [...] It sticks better to ones memory."

The fact that the stories will be available for others to see, is also regarded by the teachers as a good thing for pupils who could not attend the story creation process for some reason; they will be able to be updated on what has happened when they were absent.

Another idea that the teachers like, is the one of collaborative stories, stories that are created by more than one pupil. It is important for the pupils to learn how to interpret information and to think critical, and Storix may be helpful here. The pupils are given the ability to discuss and can correct each other when working together. The teachers also think that collaborative work will make it easier for the pupils to motivate each other; if some of them get very motivated, it could spread to other pupils.

Time and Place

The teachers mention learning how to orientate oneself with a map and seeing distances travelled as important. This enables the pupils to remember places better. "Many people are not aware of where they are" one of the teachers said. "We are used to travel from A to B, but we do not care about what's between A and B." Sometimes disagreements occur about where events happened. Knowing when something happened is not always easy to remember either: "did we go there first, when did we see the moose."

Organizing events according to when and where they happened also makes it easier for others, for example parents, to take part in the pupils' experiences at school in a way that has not been possible before: "This is nice for parents, now they can see when and where something happened."

Reconstruction of historical events is another scenario that the teachers liked and where time and place plays an important role. They think that this might be better suited for older students as they seldom get deep into the topics at lower grades. On the other hand, younger pupils have difficulty imagining when things happened: the timeline may "make it easier for young children to

see when events happened in relation to other events, otherwise it becomes too abstract." Whether something happened in 1072 BC or in 1200 AD doesn't really matter, it's just a long time ago. "If you stretch it [visually] over, say 500 years, it might be easier for them to understand", one of the teachers said.

Instant Storytelling

The teachers were positive to the idea of instant stories, but they do not want this feature for their pupils. They feel that it should be available to older kids and grown-ups only; they want to be able to control what their pupils publish on the Internet. There are two main reasons for this. Firstly, they want to make sure that the text that their pupils produce is correct, that there are no spelling or syntactical errors. The teachers feel that their pupils deserve the chance to have errors corrected before everybody can see their material.

The other reason is that the teachers from time to time experience pupils who act improper towards others. These are pupils who do not seem to care if they risk detention or other punishment if they behave badly. These students may publish pictures and text that should not be published. By controlling which stories are published pupils may be protected from bullying.

One could argue over how much harm could be caused if a pupil post improper content on the Internet. If it is removed quickly, no harm may be done at all. However, there is one problem with Internet; once you publish something, you loose control of it. It may be cached by search engines and it may be downloaded, copied and republished by others. You still have the rights to your material, but this does not really matter if people don't respect or care about other people's rights. One example of this is when a Norwegian Nazi organization copied pictures of young girls from the Norwegian Internet community "Blink"[9] and published them as part of their propaganda. As the owners of the site were not found, the girls and the police could not do much[10]. Some people try to obstruct others from downloading and copying content from their web pages, for example by disabling right-clicks and text selection. However, these are not very effective means: by having a look at the source code, by using Telnet or by taking a screen dump you can easily access the content anyway if you want to.

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[9] `http://blink.dagbladet.no`
[10] `http://blink.dagbladet.no/community/article.html?community_id=11438&article_id=508553`

Collaborative Work

The teachers liked the idea of collaborative work. "[The pupils] can share tasks: some take pictures and some write. They may have different responsibilities." But the teachers also found it interesting to let the pupils work individually: "What if we got them to create 20 different stories [about the same topic]? It would have been interesting to see how similar they [the stories] would be."

4.4.2   Summary

The teachers seemed to be very interested in the Storix concept. They had many ideas about how it could be used in school and also in other settings. In addition to being generally curious and interested, they found professional justifications for using it in school, and they found Storix to be usable in practice as a pedagogical tool.

The teachers though using a tool like Storix would make it more fun for pupils to learn and remember. They regarded it useful both for covering events that pupils had experienced themselves, and when documenting things that they had not experienced themselves, for example historical events.

On the downside, it was mentioned that instant storytelling could cause ethical problems when used by young children; one risks that they publish things that should not be published. This is of course always a risk, but it is probably greater with younger pupils.

To test how stories can be created in real life, the teachers in the group were to involve their pupils to create stories. This will be covered in the next section.

4.5   Field Testing Part 1: Observation of Story Creation

Some of the teachers cooperated, resulting in a total of four groups making stories. Two of the groups had two teachers each, and the other two groups had one teacher each. One of the groups with two teachers was much larger than the other groups having 19 pupils. The other groups had 4-6 pupils each. Three of these groups were not observed, while the largest group with 19 pupils was observed.

4.5.1   Making a Story In Rakkestad

One of the teachers were working at Rakkestad Ungdomsskole, and the 15th of February she brought 19 pupils with her around the center of Rakkestad to document some of the buildings there. The

pupils walked from place to place, taking pictures and writing short notes on paper. A GPS was brought along, and the track was transferred via Bluetooth and saved as NMEA[11] data on a mobile phone that was dedicated for the purpose. This enabled us to connect media to location.

Figure 4.3: Pupils from Rakkestad Ungdomsskole taking pictures.

Most of the pupils had mobile phones with cameras, and they took pictures whenever they felt like it. Digital cameras save the time for each picture automatically, while the pupils who took notes had to write down the time for each note that was made. The notes were later elaborated by doing interviews, finding facts on the Internet and so forth. Different pupils were responsible for covering different buildings visited, making this a collaborative story. All the pupils took part in the storytelling in one way or another.

The pupils seemed to enjoy the trip. They were allowed to have a snowball war, and to use their mobile phones (both things not allowed during a normal school day). The pupils were eager about taking pictures and writing. However, they were even more eager about throwing snowballs at each other, something that was also documented by the cameras. The teacher reported afterwards that she felt that she might have planned the trip better, but that it was a positive experience.

A few problems were encountered during the trip. The first problem was to get twenty 13-year old children to synchronize their clocks. However, as this trip was all done by foot, it was decided

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[11]NMEA is a data format for GPS tracks.

that the accuracy needed not be perfect. Another problem was that the phone that was saving the data from the GPS stopped doing so after about one hour. However, the lost data was easily recovered manually afterwards as the path and places were known and there had been taken many pictures (with timestamps) in the area that was not covered by the GPS.

4.5.2   Making Of The Other Three Stories

In addition to the Rakkestad trip, three other groups also carried out field trips. These groups had less pupils than the Rakkestad group. These trips were not observed by the author. One of these groups have not been followed up with user observation due to time constraints. It will therefore be omitted here, leaving us with the evaluation of two groups in addition to the Rakkestad group. Both these groups were from the Kurland School in Sarpsborg.

The two groups from Kurland worked closely together. One group went cross-country skiing while the other group went slalom skiing. They travelled together to the slalom hill where they split up. The slalom group did not have a GPS since they only covered a small area[12]. The slalom group had Norwegian as their main subject for the trip. The focus was on the writing process that was to take place after the trip. The group going for a skiing trip had nature studies as their subject, and was to look for animals and animal tracks.

According to the teachers, motivating the pupils ware not difficult. However, they felt that it was a bit difficult to explain to the pupils what they were actually doing, as the pupils had not yet seen Storix. Nevertheless, it seemed sufficient to tell them that they were to take pictures, note the time and write what they did to get them interested and motivated.

The two groups had no problems with the GPS[13]. However, they reported that they were unsure about how it worked, so they wrote down their position on the notes that were made. Both groups also forgot to synchronize their clocks.

Another problem that these groups had (which the Rakkestad group also experienced), was to copy pictures from mobile phones to computers. This was caused by all the various solutions on the phones: proprietary software, proprietary cables, strange and not very user friendly solutions, and so on. The result was that a lot of pictures were not used in the stories. Despite this, there seemed to be a good selection of pictures to use.

After the trips, the pupils elaborated on their notes. The teachers then collected the material that the pupils had produced.

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[12]Some points were created manually afterwards, in order to connect content to position.

[13]As distinct from the Rakkestad group, these groups used a GPS unit that saved data itself.

4.5.3   Organizing Collected Data

After the pupils had finished their work, the teachers organized and imported the data into Storix. They were guided through this process, as the tool developed for this purpose had many limitations; it was written only to make the process a bit easier than to manually write an XML file.

The process of importing data into Storix consists of 3 steps: Import the track, create episodes and events, and upload pictures and text to each event. As mentioned earlier, synchronization was not topnotch for some of the groups. However, as the stories' time spans and areas were very limited, this did not cause large problems. In addition, one group only had a GPS track for half of their trip and another group did not have a GPS track at all, as they were at the same place all the time. For these two groups we had to manually create GPS track files.

During the process of importing content, the teachers were part of forming the story by deciding what pictures to be used. They also decided which text to be used under each picture. This text was created by copying parts of the text that the pupils had written, and then editing it to fit to the picture.

4.5.4   Summary

The pupils seemed to enjoy creating stories. They seemed to be motivated, even though the teachers had problems explaining to them what they actually were doing. The teachers managed to span a variety of subjects, from language (Norwegian) to nature study and social studies. A few technical problems were encountered, but none of them were unsolvable.

After the content for the stories had been made, the teachers were guided through the process of organizing the data and getting it into Storix. The stories were now ready for part two of the field testing, namely Storix being used by the pupils.

4.6   Field Testing Part 2: Observation of Storix in Use by Pupils

As part of the testing, the pupils were to experience their stories through Storix. There were two rounds of studies, one in Rakkestad and one in Fredrikstad. In Rakkestad, one group was observed, and in Fredrikstad, two groups were observed. Each group was divided into subgroups with 2-4 pupils that were to test Storix. The pupils were told to sit down and have a look at their story without given any preliminary instructions. In Rakkestad, two computers were used at the same time; in Fredrikstad only one computer was used. A video camera was positioned behind the pupils.

They were made aware of the camera and that they were being filmed. Storix has been tested by three of the four groups that created stories.

Figure 4.4: Two pupils from Kurland School in Fredrikstad interacting with Storix.

The pupils were a bit shy and giggling in the beginning. This might have been caused by the camera, but might as well have be the situation in general. However, since the camera was behind them and they were left busy with a computer, they seemed to forget the camera quickly. Full transcripts of the sessions are found in Appendix A.2.

4.6.1 Findings

Practical Usage of the Tool

All the groups immediately started scrolling the text when introduced to Storix, except for one group where the users started by clicking on events on the map. The other groups did not seem to see the map or the timeline, and all groups except for two had to be reminded of the map in order to start using it. The existence of the timeline had to be pointed out to all the groups.

When the users became aware of the map, they almost instantly understood both what it was showing and how to use it. They clicked the events and saw the connection to the text. Some of the groups also panned the map and zoomed in and out[14].

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[14]this did not work in Rakkestad as we did not have an Internet connection and thus could not download new maps.

The same goes for the timeline. Once reminded of its existence, only a couple of groups were a bit unsure what it was and had to be given some hints. The others groups allmost instantly understood what it was. How it was used differed a bit from group to group; some clicked the event marks, some dragged it and some used the arrow buttons. However, all groups were able to use it and to jump between events.

Except for two, none of the groups used the "focus" link in the text. One group where specifically asked to try them, and the other group were asked if they could make the map and timeline pan without interacting with them.

After interacting with the tool for some minutes, the pupils were asked to explain how it worked. All groups were able to tell how to use both the timeline and the map, and also the connection between the text/pictures, the map, and the timeline.

Reaction to Seeing Their Story

All the pupils immediately started scrolling the text (except for the one group who first used the map) and looking at the pictures. When asked if they recognized the story, all the pupils said that they did. They were also asked whether they missed anything, and some pupils from Rakkestad pointed out that the railway station was not mentioned; one of the groups where responsible for writing about it, but were not able to finish their work and deliver it in time.

The pupils seemed happy about using Storix. They were speaking together with low voices as they scrolled up and down, and on some groups there were giggling and laughing in the beginning. Expressions like "Aha" and "nice" were used by some of the pupils as they understood more of the functionality.

Whether Storix supports the pupils conceptual model of the story is a bit hard to say. However, everybody recognized their story and had no problems using Storix once they got used to it, which proves that Storix works.

Creation Of the Story

The pupils did not think that it was difficult to create a story. They also thought it was nice to work together; some reported that this meant more ideas and that they had to use less time to finish the stories. They thought that this way of working could be useful in other subjects too.

The pupils from Rakkestad reported that the most difficult thing about making stories was finding information. They were writing about buildings in Rakkestad, and had problems finding facts

on this topic on the Internet.

4.6.2 Summary

The pupils gave positive response on both creating the stories and on the experience of seeing them through Storix. They recognized their story, and they felt ownership to it. They also gave a positive response when asked if they wanted to use Storix again.

When it comes to the Storix interface, the pupils seemed to understand how to use it. However, some of the groups only used parts of the functionality and had to be given hints and asked about specific functionality in order to explore it further. Despite this, the pupils were able to explain what the different parts of the interface were and how they were connected to each other and to the story.

After the three main steps of the explorative design and testing phase, a small usability test was set up. The focus of the test was the timeline, and this is the topic of the next section.

4.7   Timeline Testing

As mentioned in Chapter 4.3, some users felt that the timeline should move in the opposite direction of what it did when clicking its arrow buttons. Therefore, as an addition to the three main elements of the explorative design and testing phase, an usability test[15] was set up. The users in this test were random people stopping by the Storix stand at "Datamessen" which were arranged at Høgskolen i Østfold the 27th of March 2007.

The users were asked two questions: "how does it seem like the time on the timeline changes?" and "which way do you think it is natural for the timeline to move when clicking the arrows?".

4.7.1 Findings

On the first question, the users could choose between two models. The first model stated that the time points stood still while the users moved over them, much like when you fly over a landscape: you move, the landscape stands still. The second model stated that the timeline/background moves while the user stands still. This can be compared to when you look out of a window and something, for example a bus, passes. As can be seen from Table 4.3, most users felt that the timeline moved below them while they were standing still, while about 1/3 of the users felt that they were moving while the timeline stood still.

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[15]it can be seen at `http://stories.scesoh.com/slidertest`

Table 4.3: The users model of the timeline

User moves	Landscape moves
13	29

Table 4.4: How the users would like the timeline to move

Timestamps move away from arrow	Timestamps move towards arrow
32	10

For the second question, "Which way do you think it is natural for the timeline to move when clicking the arrows", the timeline was set up with two pairs of arrows (see Figure 4.5). The first pair moved the timeline in opposite direction of the other: The upper pair moved the timeline so that the time stamps moved away from the direction that the arrow was pointing, hence one moved "forward in time". The bottom pair of arrows moved the time stamps the same way as the arrows pointed, hence dragging the timeline itself "physically" like an assembly line the same way as the arrow points. Like Table 4.4 shows, the majority of users felt that the timeline should "physically" move in the opposite direction of how the arrows pointed; the idea of moving forward in time seemed more natural to them than moving the timeline "physically" in this case.
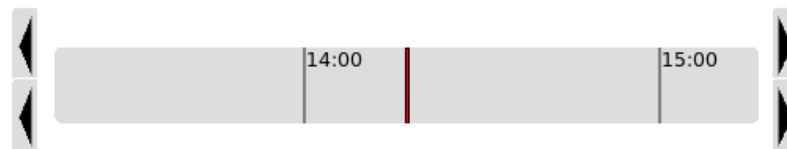

Figure 4.5: The timeline arrow test

4.7.2 Summary

It was indicated from the early questionnaire with expert users that the direction the timeline moved did not feel right for everyone. From the results of the timeline arrow testing, it was decided that the direction of movement should be switched.

4.8   Summing Up the Explorative Design and Testing Phase

The design experiment consisted of three main stages and a small usability test at the end. The intention of the first stage was to remove any bugs and design faults on the prototype that could interfere with later testing. The second stage was about establishing a user group and to find out about their thoughts and feelings for the project, explore areas of usage and to make them feel ownership to the project. The third stage was about using Storix "in the wild", with real users and real context. The third stage was followed by a small usability test.

Before the first step, a prototype was created. Instead of collecting requirements from users, the information from literature studies prestented in Chapter **??** was used to deduct requirements. From this, a design was proposed. This prototype was tested by expert users and some end users in order to make the user interface usable and intuitive. The first step revealed a few issues with the prototype. However, no major design issues were uncovered. The prototype was changed according to the results and thus made ready for later testing.

The second step was about connecting concept with practice. This was about finding areas of usage, to let the users understand the concept better and to make the users gain an ownership of it. A group of 6 teachers volunteered to the project, and a group interview was carried out. In general, the teachers expressed a very positive attitude towards the ideas surrounding Storix. They saw many possibilities for using a tool like this, and they also found several places in the Knowledge Promotion reform where it could be applied. They could think of many subjects where Storix could fit in. Furthermore, they saw this as an opportunity to use IT in school, something that the Knowledge Promotion mentions several times, but which is not always easy to achieve due to e.g. material constraints and lack of knowledge. They were eager to start using Storix.

The third stage was field testing: the teachers, together with their pupils, were to create their own stories, and later to experience them through Storix. The story creation was done by going on trips with a GPS, cameras, and notepads to collect information. The data were then collected and organized. The pupils' thought creating stories was fun (they were not participating when putting the content into Storix). They recognized their stories and enjoyed experiencing them through Storix. They also said that they would want to use Storix again. The teachers seemed to share these thoughts: one of the them asked to borrow a GPS a few weeks after the testing was undertaken so that she could create more stories with her pupils.

Chapter 5

Conclusion

In this chapter, claimed results are presented. Discussions have been done in the previous chapter.

5.1 Claimed Results

In this thesis the potential of augmented storytelling has been investigated. This investigation has been broken into three parts: exploring if it is possible to use standard off-the-shelf software components to build a web based narration tool for experiencing augmented stories, if augmented stories are useful for the common user, and if there are applications where augmented stories might be of particular use or interest.

Use of Off-the-shelf Software Components

It has been found that it is possible to use standard off-the-shelf software components to build a web based narration tool for experiencing augmented stories. This has been done and demonstrated through the development of the Storix proof-of-concept prototype where well-known technologies such as HTML, JavaScript, CSS and XML have been used to create a web page for experiencing augmented stories.

By using HTML, CSS, and JavaScript it is possible to create new elements for use in web pages. The timeline used in Storix had to be written using HTML elements that were originally meant for other usages. However, this is a common approach for creating new tools for use in web pages, and other much-used tools such as Google Maps follow the same approach. Open source widgets and tools created in this fashion are becoming increasingly common and are likely to make future implementation of other and similar concepts on the web easier.

Usefulness of Augmented Stories

A group of teachers and pupils have tested Storix in a real life setting. From this limited selection of test users and their experiences, augmented stories seems to be useful. The teachers found ways to use it, and both the teachers and the pupils reported to be happy with the concept. No negative feedback was received. It is believed that the usefulness of augmented stories also applies to the common user.

Applications for Augmented Stories

Various applications for Storix have been proposed in this thesis. Scenarios have been proposed, including education, journalism, and crime investigation.

Education is the application that has been in focus in this thesis, especially the use of Storix to cover excursions. So far, Storix seems to be a useful tool in this area. From the experiences it is also believed that Storix can be used for other applications, including the scenarios presented in Chapter 3.1.

5.2   Major Contributions

The contributions of this thesis are:

- A working prototype of a tool (Storix) for experiencing Augmented Stories.
- A simple and limited tool for adding and organizing content to be viewed in Storix.
- Proposals for use of augmented stories.
- Experiences from and examples of storytelling with Storix in an educational setting with teachers and pupils from 5th to 8th grade.

5.3   Further work

The usefulness of Storix in other settings than educational ones should be explored. Further augmentation of stories should be looked into. This may include adding other dimensions than time and location, for examples by showing the mood of the storyteller. Whether the storyteller is happy or sad could be illustrated with a graph that is navigable. Other context related information could be illustrated in the same way, like elevation and velocity[1]. Further, as already proposed in this thesis, the ability to select viewpoints in collaborative stories is a possible way of augmenting stories.

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[1]This has been implemented in the Magnalox viewer. See `http://www.magnalox.net/log/no.php?lid=11094` for an example of viewing elevation information.

In addition to further augmenting stories, the creation of stories for Storix should be further explored. This includes automation of content organization and real time storytelling.

There are also a lot of details that could be implemented: a play button for playing back stories, use of time intervals, handling of events that overlap in time, and support for areas and curves in addition to location points. Also, issues like loading a story more efficiently should be addressed.

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List of Figures

List of Tables

Appendix A

Transcripts

A.1 Focus Group Interview

Four of the six teachers were present at the group interview. The transcript is in Norwegian.

Spørsmål 1: Hva er deres pedagogiske målsetning og tanker med å være med på dette prosjektet?

Lærer 1: snakker for meg selv, men tror andre kjenner seg selv igjen. Vi er i en utdanningssituasjon selv og du kom og presenterte en mulighet, da var det greit å gripe den. Samtidig er det ikke vanskelig å se at tankene du har hatt er matnyttig for oss å la elevene være med på (Tatt med kunnskapsløftet). Tenkt mitt i forhold til norsk, fredrik i forhold til naturfag, og i begge fag er det flere steder i kunnskapsløftet som relaterer til det vi er inne på her. Det med å hente, dokumentere ting, skrive, formulere seg. Da er det en gratis mulighet for meg til å få et spark bak, til å virkelig sette i gang et sånt prosjekt, som egentlig burde hatt det uansett. Men det er tungvindt for oss mtp. dårlig med teknologi osv. Jeg føler at jeg har fått et spark bak nå. Det er flere plasser i kunnskapsløftet jeg kan sitere fra.

Lærer 2: Ikke så mange tanker, syntes det hørtes spennende ut. Lå ikke så mye mer bak det.

Lærer 3: Samme føler jeg. mange fag som kan dras inn i dette.

Lærer 4: Lett å motivere elevene, noe nytt. Teknologi, noe interessant, ikke bare å skrive eller ta bilder. Elevene mine har ikke fått beskjed enda.

Lærer 2: Bruke i forhold til samfunnsfag (se på bygninger) + norsk.

Intervjuer: Hvilke fag ser dere for dere å kombinere dette med (til Lærer 4 og Siw-Hege)?

Lærer 4: Jeg har så mange klasser, så mange fag, bare bruke det som et opplegg.

Lærer 2: Bare det at vi gikk en tur...

Lærer 4: Det er så mange fag; IKT, norsk (skriver), gym (går rundt), naturfag (hva du ser), samfunnsfag (hva du ser). Mange muligheter. Kan brukes i de fleste.

Lærer 1: Jeg synes nettopp Norsk er viktig. En ting jeg har oppdaget (har 2 sjetteklasser) er at det står veldig dårlig til med å skrive med tastatur, det trenger de mye øvelse på. Så kjekt som det er med et redigeringsverktøy på PC'en... Da får vi dette med prosessorientert skriving, at de kan gå igjennom teksten etterpå og få feedback, forandre... Så de har fine muligheter til å lage tekster som bare ikke er den første de skriver. Skriver de hånd, så blir de slitne og er på en måte ferdig når de har skrevet den første gang.. Med PC kan de redigere, trekke fra, legge til. Viktig norsk-verktøy. En av elevene har kjempeproblemer med å skrive, men ikke med å formulere seg. Da blir det med ordentlig med en gang, slipper å tegne border.

Spørsmål 2: I hvilke situasjoner ser dere for dere at en slik måte å jobbe på (altså ved å lage historier) kan være nyttig?

Lærer 1: Et av de 5 momentene elevene skal kunne beherske, å kunne uttrykke seg muntlig og skriftlig. Når jeg ser nærmere på spørsmålet... Jeg ser at den kan være nyttig i mange situasjoner.. Men hvor praktisk gjennomførbart i store klasser med bare 1 lærer?

Lærer 4: Kan dele på oppgavene, noen tar bilder, noe skriver... Ansvar for forskjellige ting.

Lærer 1: Tenke mer sånn at man må gjøre det mange ganger, at alle får sjansen til å prøve seg.. Slik at alle får sjansen.

Lærer 4: Nå skal de ha noe å vise senere, da konsentrerer de seg kanskje mer. Da kan de ikke bare lage leven, slik som enkelte ofte gjør. Også må de bearbeide det senere. Intervjuer: Enn det med historier, det å fortelle? Hvordan kan det være nyttig? Det å presentere en historie? Historieaspektet, det med hendelsesforløp, at det ikke bare blir en faktatekst...

Lærer 1: Norskfaget igjen. Fra man er små, forteller man jo fortellinger... Dette er jo en utvidet fortelling. For oss blir det at vi var på tur.

Lærer 3: Man får mer tilhørighet, det blir ikke bare en faktatekst, det blir noe man har vært med på og kan fortelle om..Det blir bare ikke å fortelle om et sted.

Lærer 4: Forandre mellom subjektivt og objektivt, kan være utfordrende det også.

Intervjuer: Noen kommentarer, hvis dere ser bort fra at dere er lærer?

Lærer 4: Fotballag på tur... Reiser, hva gjorde dere da, hva gjorde dere der. Dokumentere tur.

Lærer 1: Det å orientere seg på et kart, avstander man tilbakelegger osv... Det er mange som er bevistløse på hvor de befinner seg. Man er vant til å reise fra a til å, men bryr seg kanskje ofte ikke om hva som er imellom. Intervjuer: Av og til kan det kanskje også oppstå uenighet og diskusjon

om hvor ting skjedde og når det skjedde.

Lærer 1: Du var jo inne på det istad (til Lærer 4), det var lett å få med folk. Men det var flest jenter, bare én gutt, selv om de ble lovet at det ikke skulle bli mer arbeid (tror dette er spesielt for denne klassen, guttene er veldig sjenerte). De som er meldte seg og som er med, er kjempemotiverte, de gledet seg. De er i ferd med å runde 12 år, de synes det var veldig morsomt. Motiverende tiltak.

Spørsmål 3: Hvordan ser dere for dere at selve fortellerverktøyet kan brukes i en undervisningssituasjon, og da spesielt med tanke på tids- og stedsaspektet?

Lærer 1: Du sa det litt selv i stad (til intervjuer), det å være klar over når ting skjer. Men det er jo ikke det vi jobber mest med i skolen. Men på en litt lengre tur, på leirskole for eksempel, da ser jeg at det kan være spennende å tenke på hva som skjedde når. Dro vi først dit, så vi elgen da...

Lærer 4: Fint for foreldrene i ettertid, kan se hvor og når ting skjedde.

Lærer 1: Fredrik hadde håpet de kunne se spor i skogen, her har reven gått osv. De så desverre ikke så mye spor, men de gjorde andre ting underveis.

Intervjuer: Hvordan ser dere det å bruke dette på andre måter, for eksempel ved å rekonstruere en historisk hendelse? Kan dette være interessant?

Lærer 1: mhm *nikker*

Lærer 3: Morsommere måte å lære på enn å lese i boka. Da er man inne og jobber med det, og lærer.

Lærer 1: Da må man jo bruke oppslagsverk og søke etter informasjon, det står det også om i kunnskapsløftet

Lærer 4: Da kan man også hente tekst fra andre steder og slipper kanskje å skrive alt selv, samle informasjon og redigere den sammen.

Intervju: Men dere tror altså det kan være en god idé?

Alle samtykker

Intervju: Noen som vil prøve?

Lærer 1: Dårlig tid...

Lærer 2: Kanskje i mai.

Lærer 4: Jeg har ikke tenkt på å bruke dette verktøyet til slike ting i det heletatt før du nevnte det nå, bare tenkt på det å lage historier fra turer osv.

Lærer 1: Jeg er glad i historier selv, men på barneskolen går vi jo skjeldent i dybden. Har hatt samfunnsfag tidligere, men ikke i år. Men hvis man har om f.eks. vikingetida, kunne vi fulgt Olav den Hellige.. Men vi følger kanskje ikke så nøye fra år til år...

Lærer 4: Kanskje lettere for små barn å se når ting skjedde i forhold til hverandre, blir abstrakt ellers. Om ting skjedde i 1072 eller i 1200 f.kr. er så lenge at de ikke skjønner det. Hvis man strekker det over, si, 500 år, så er det kanskje lettere for dem å forstå og lære med et slikt verktøy. Alt blir kanskje bare for lenge siden for dem.

Spørsmål 4: Hvilken type historier ser dere for dere at kan fortelles med denne typen verktøy?

Lærer 1: Reportasje, det har vi alt vært innom. Men også fri fantasi. Reise fra ett sted til et annet og bruke stedet som scene for en diktet hendelse.

Lærer 3: Ta utgangspunkt i et sted, hva ville skjedd videre om vi ikke gikk dit vi gikk?

Spørsmål 5: Tror dere det vil styrke virkningen av en historie i en klasse ved at den er laget av klassen kontra hvis den var laget av noen andre og lest i en bok?

Lærer 4: Når man har vært med på den, så bruker man mer tid, og det blir lettere å huske... Man har både sett og hørt

Lærer 3: Får et annet forhold til det, det blir ditt... Man får et eierforhold til det Intervjuer: Tror dere dette med tid og sted gjør at det kan bli lettere å huske, lettere å få et eierforhold?

Lærer 1: Jo flere måter man gjør noe på, jo mer vil det feste seg. Unger ofte veldig korrekte, hvis en ikke er helt sannferdig, vil en annen arrestere vedkommende. Kan få endel samtaler og korrekser gjennom at flere jobber med samme ting.

Intervjuer: Vil det være en fordel om de samarbeider, i steden for at kun én lager??

Lærer 1: Ja. Men idéelt sett, tenk om vi lagde 20 forskjellige historier, hadde vært spennende å se hvor like de ville blitt...

Intervjuer: Spessielt om man også måtte tolke ting?

Lærer 1: Ja, og det skal vi jo også. Det er noe som jeg synes kan bli vanskelig framover, å øve ungene opp til å tolke og tenke kritisk. Hva som er viktig, hva som ikke er viktig.

Lærer 4: En slik måte å jobbe på vil kanskje skape litt blest og motivasjon, for å få fart i klassen. Hvis noen blir veldig motiverte, så kanskje det sprer seg.

Spørsmål 6: Tror dere historier som blir presentert på nett mens de foregår (bilder og tekst blir lastet opp og presentert umiddelbart) vil være en fordel kontra historier hvor data blir samlet inn og bearbeidet før de blir presentert?

Lærer 4: Det har jeg ikke tenkt på at går an i det heletatt...

Lærer 1: Har niese som dro til østen, var borte i flere måneder, morro å se på reisebrev på hjemmesiden, å følge og se bilder og tekst. Blir ikke fullt så oppdatert... Men hun er voksen. I den aldersgruppen jeg har, ville jeg ikke ønsket det. Jeg ønsker å kontrollere litt det de gjør på skolen. Intervjuer: Når man har lagt noe ut på nett, har man på en måte mistet kontrollen... Det kan ta litt tid før man får fjernet ting, og det kan komme på avveie.

Lærer 1: Jeg tenker egentlig ikke så langt heller. Det som skrives, det vil da stå der, jeg synes de fortjener at noen går sammen med dem først, poengterer skrivefeil osv. Sørger for at det er litt ordentlig...

Lærer 3: Hvordan er redigeringsmomentet?

Intervjuer: Det skal gå an uten problem.

Lærer 1: Dette må kunne være realistisk også å kunne bruke i videregående. Kanskje mer aktuelt der...

Lærer 4: Mange i videregående som drar på tur, f.eks. nedover i europa.. da vil det være fint om de hjemme kunne følge med. Men når ungene er små, vil kanskje en skrivefeil være å drite seg ut. Derfor er det viktig å få sjekket det først. Men det er en fin mulighet for de eldre.

Lærer 3: Fint for andre å kunne se, men kanskje ikke så aktuelt for dem selv?

Lærer 4: Seile jorda rundt, ville vært glimrende! Isteden for å dokumentere alt i ettertid, sikkert mye dødtid på en sånn tur...

Lærer 3: På såpass lange turer, kunne det nok blitt mye jobb etterpå...

Lærer 1: Kan jo også være interessant for noen som ikke er kammerat, kan jo selge det til noen... Lærerskoleelever som kanskje drar på villmarksturer. Må jo være kjempeartig! Men også viktig å kunne se i ettertid.

Lærer 4: Blir på en måte to forskjellige ting, det å kunne følge og det å se i ettertid. Blir litt som å se en blogg, bare at det blir mer moderne.

Lærer 1: Ormen stutte, 70-tallet, de dro og skulle kjøpe kart for de skulle over atlanteren til mexicogulfen. det ble det ene blå kartet etter det andre, men de kjøpte kart helt fram.

Intervjuer: Verdi for andre, foreldre, andre klasser?

Lærer 2: Alltids noen som ikke får vært med hvis man reiser på tur, fint for dem å kunne se hva som skjer.

Lærer 4: På lange turer vil det være bra.

Spørsmål 7: For de som har vært på tur, hva er deres opplevelse så langt? Har dere noen råd til de som skal på tur?

Lærer 2: Var jo ikke så kjempelang tur vi var på... Elevene likte å være på tur og få lov til å bruke telefon. Positiv opplevelse. Kanskje litt dårlig planlagt fra min side... Ville kanskje ikke gjennomført en akkurat sånn tur igjen, ville tatt en lengre tur.

Lærer 1: Vi kjørte jo bil, og stoppet bare ett sted for å ta et bilde. Vi var litt usikre på bruken av GPS'en. Litt uenige om vi måtte skrive ned koordinatene eller ikke. Vi var ikke så nøye på synkroniseringen, iallefall på kameraer.

Intervjuer: Dette kan vi også ordne litt på i ettertid.

Lærer 2: Vanskelig å forklare elevene hva dette skal bli... De må nesten få sett verktøyet først.

Lærer 1: Så kravstore var ikke mine; sa at vi skulle ta bilder, ta tiden når det er, vite hvor vi er og så fortelle hva som skjedde akkurat der. Kanskje dere skal skrive noe om stedene etterpå. Da var de bare tente med en gang. Men de hadde ikke noe forestilling om hva dette skulle bli...

Intervjuer: Håper dere synes det er interessant å være med på dette?

Lærer 4: Det er en annen måte å tenke på. Ofte når jeg skriver oppgaver, så skriver jeg dem bare for å skrive dem. Man må gi mer av seg selv, da blir det mer interessant. Isteden for å si at man skal sette av 3 timer her og 3 timer der, også glemmer man det sånn *knipser*. Det fester seg bedre, lettere å huske.

A.2   Kurland

A.2.1   Session 1

2 pupils, 1 teacher, 1 interviewer.

Intervjuer: Se på det

Elever: *ler og prater om teksten*

Elever: *godt humør*

Intervjuer: Kjenner dere igjen?

Elever: ja *ler*

Elever: *scroller opp og ned tekst*

Intervjuer: Hvordan lagde dere historien?

Elev 1: Vi skrev, Lærer 5 hjalp oss litt da, så han hjalp oss med det vi skulle skrive om

Intervjuer: så alle har vært med å skrive?

Elever: ja

Intervjuer: var det dere som tok bildene også?

Elever: ja

Intervjuer: Har dere laget sånne historier før, at dere har vært på tur og tatt bilder og skrevet om det?

Elever: nei

Intervjuer: Ser dere det er et kart over teksten?

Elever: *peker* der

Intervjuer: Se om dere kan gjøre noe med det?

Elev 1: *klikker på selve kartet, men ingenting skjer*

Elev 1: *gir musa til elev 2*

Elev 2: *klikker på ballong på kart*

Elever: oi! *latter*

Intervjuer: Hva skjedde da?

Elever: *ler* Jo, det kommer opp der vi var...

Elever: *klikker mer* åja!

Intervjuer: Hva er under kartet da?

Elever: å, tiden!

Elev 2: *klikker mer på kartet*

Elev 2: *zoomer tidslinje*

Elev 2: *klikker på tidslinje uten at noe skjer, så dras den plutselig* aha!

Elev 1: *overtar musa, klikker på kart*

gry: Det er lov å prate, bare snakk med hverandre!

Intervjuer: Hvorfor var dere på tur egentlig?

Elev 2: Vi skulle til kjerringåsen og stå på ski

fredrik: Snakk litt høyere

Elev 2: så skulle vi gå langrenn

Intervjuer: hvilket fag var dette, gjorde dere det i et fag?

Elever: *usikker latter*

Intervjuer: dere skulle se etter dyrespor?

Elever: ja...

Intervjuer: Fant dere noen dyrespor?

Elever: ja!

Intervjuer: Hvilket dyr så dere, eller fant spor etter?

Elever: hund, veldig mye... så mest av hunder. men det var ikke så mange som var ferske.

Intervjuer: lærte dere noe av å dra på tur?

Elever: vi fant iallefall ut hvordan dyrespora så ut, hvor forskjellig de var og sånn

Intervjuer: Var det lett å skrive sammen og lage en sånn historie sammen?

Elever: ja...

Intervjuer: hvordan synes dere det er at andre kan se historien når den ligger ute på nett?

Elever: vet ikke..

Intervjuer: er det greit at mamma og pappa kan se hva dere har gjort på skolen?

Elever: ja.

ferdig.

A.2.2   Session 2

2 pupils, 1 teacher, 1 interviewer.

Elever: er det der vi begynnte?

Lærer 1: vet ikke hvor mye vi skal si, dere kan jo prøve litt?

Intervjuer: ja, bare se og trykke og se hva som skjer

Elev 1: *trykker på ballong på kartet umiddelbart*

Elev 1: * scroller og leser*

Intervjuer: kjenner dere igjen?

Elever: ja!

Lærer 1: kjenner dere igjen noen bilder som dere har tatt?

Elever: mhm

Intervjuer: skrev dere også, eller tok bare bilder?

Elever: skrev også

Intervjuer: skrev dere samme tekst, eller hver deres?

Elever: hver vår.

småparater og scroller

Intervjuer: har dere vært på sånn tur før og tatt bilder og skrevet?

Elever: nei...

eksperimenterer med kartet, satelitt osv.

Lærer 1: hva skjer, hva er det?

Elev 2: hybrid står det

zoomer kart

Intervjuer: hvorfor var dere på tur egentlig?

Elev 2: vet ikke...

Lærer 1: tenk etter, hva skulle vi den dagen? var du bare så opptatt av å fotografere?

Elever: vi skulle på slalomtur!

Lærer 1: Ja!!

Elever: *diskuterer kartet og veien de kjørte*

Elev 2 vil ikke, elev 1 får bruke

bug: virker ikke etter å ha klikket på kart. må åpne historien på nytt

Intervjuer: ser du under kartet?

Elev 2: der?

Intervjuer: ja, se om du kan gjøre noe med den...

Elev 2: *scroller tidslinje*

Intervjuer: hva er det?

Elev 2: tid og sånn! hva er de røde strekene til?

Intervjuer: prøv å trykk og se hva som skjer

virker ikke. må reloade siden

Elever: *klikker på event på tidslinje*

Intervjuer: ser du hva det er?

Elev 2: veien vi kjørte?

Intervjuer: Tenkte på det som er under kartet...

Elev 2: her?

Intervjuer: ja. skjønner du hva de er røde?

Elev 2: disse? nei...

Elev 1: sånn at man flytter dit man tar bilder...

Intervjuer: ser du det står tall?

Elev 2: da er det klokka da

Intervjuer: så ser du hvor du var da

feil med opptak til

Lærer 1: *prater om punktene, at de ligger nært hverandre. får elevene til å trykke på ballongene*

Intervjuer: synes dere det var lett å bruke, eller var det vanskelig?

Elev 2: litt vanskelig kanskje, men har skjønt det nå da

Elev 2: trenger kanskje ikke å trykke på dem, kan jo bare gjøre sånn her... *scroller tidslinjen til etter at de er hjemme*

Intervjuer: er det noen enkelre måte å komme seg tilbake på enn å spole tidslinjen?

Elev 1: *zoomer ut tidslinje* sånn?

Elever: *scroller*

Lærer 1: kjenner dere igjen tekstene deres da?

Elever: mhm..

Intervjuer: hvilken skrev dere?

Intervjuer: skrev til bildene vi tok og hvordan det var i bakken.

diskuterer bildene, hvem som tok dem

Elev 2: *kommenterer at "ø" mangler*

Lærer 1 prater om hvordan det fester seg i hodet hvilke bilder man har tatt og ikke tatt

Lærer 1: tror du at dere kunne brukt det verktøyet her en annen gang¿

Elever: kanskje det?

Lærer 1: når kunne vi det, altså tatt med kamera og etterpå skrive om det? når, hva slags aktiviter?

Elever: på skolen?

Lærer 1: ja. kunne vi gjort det flere ganger?

Elev 2: ja, på leirskole og sånn

Lærer 1: kanskje vi skulle gjort det?

Elev 2: kanskje det...

Intervjuer: dere synes det var gøy?

Elever: ja.

A.2.3 Session 3

2 pupils, 1 teacher, 1 interviewer.

scroller opp og ned Intervjuer: Kjenner dere igjen? Elever: ja Intervjuer: ser dere noe dere

har laget Elever: ja Intervjuer: hva skrev dere om? Lærer 1: fortell hvis dere finner noe dere har laget... *forteller hva de har laget* Intervjuer: dere har både skrevet og tatt bilder? Elever: ja... Intervjuer: har dere vært på tur før og tatt bilder og skrevet? Elever: vi tok vel litt når vi kjørte til bakken... Lærer 1: men ikke før på skolen? Elever: nei. Intervjuer: har dere skrevet tekst sammen? Elever: ja Lærer 1: satt dere sammen to og to? Elever: nei, skrev hver for oss Intervjuer: hvordan var det å lage historie sammen med andre? Elever: morsomt. Lærer 1: *snakker om tid og samkjøring, om å jobbe hjemme* *snakker om bilde* Intervjuer: ser dere at det er noe over teksten og bildene også? Elever: ja.. Intervjuer: lengre opp på skjermen! Elever: der? Intervjuer: ja! hva er det? Elever: det er kart! Intervjuer: hva viser det? Elever: Sarpsborg.. Intervjuer: viser det noe mer? Elever: hvor vi har kjørt... Lærer 1: kjørte vi den gule veien? nei, vi kjørte der... Lærer 1: prøv å trykk på de? Elever: *trykker* Lærer 1: oi, der ble den grønn. hva skjer da? Elev 1: den viser det som er derfra. Lærer 1: var dere bare på de prikkene der da? Elev 1: vet ikke... åja, sånn *scroller kart*

bug, refresh, åpner selv

bug på nytt

scroller tekst Intervjuer: Hva er mellom kartet og bildene? Elever: det er tid, eller... tid. der vi tok bildene, de ræde strekene Lærer 1: prøv å trykk på dem

ingen ting virker, åpne på nytt

trykker på event *scroller tidslinje med pil* Lærer 1: så du at den ble grønn? Lærer 1: hvem av dere tok det bildet? Elever: *en av de andre elevene* *scroller tekst* *Lærer 1 prater om fine bilder* Intervjuer: synes dere det er ok at andre kan se turen på nett? Elever: ja. Intervjuer: så det er greit at mamma og pappa ser det dere har gjort på skolen? Elever: ja *lavt*. Intervjuer: *informerer om at det ligger ute på nett* Lærer 1: oppe på kartet, så er det en sånn linje helt til venstre. hva er det? hva skjedde da? *zoomer* Intervjuer: hvis dere er nede i teksten og leser, klarer dere å få stedet som hører til teksten å komme opp på kartet? Elever: der? *trykker på "focus"* *Lærer 1ry kommenterer* Intervjuer: er det noen andre ganger dere kunne tenkt dere å bruke dette, noen andre fag? Elever: ja Intervjuer: hva da? Elever: natur og miljø. naturfag Intervjuer: hva skulle dere gjort da? Elever: planter og dyr Intervjuer: hvor dere har funnet en plante? Elever: ja Lærer 1: *prater om at de trenger GPS* Elever: *finner Oslo* Intervjuer: er det noen måte du kan komme deg til slalombakken på nå? Elever: *trykker focus* Intervjuer: Synes dere det var gøy? Elever: ja. Intervjuer: se om dere finner noen andre turer enn den dere var på? Elever: *åpner "driving around in halden", men er raske til å åpne sin egen historie* Lærer 1: *kommenterer gjenkjennelse av det de har laget selv* *blir sittende og leke med kartet mens Lærer 1 og Intervjuer prater* ferdig.

A.3   Rakkestad

A.3.1   Session 1

3 pupils, 2 teachers, 2 interviewers. No internet connection, so zooming maps did not work.

Intervjuer 1: Der har dere turen dere var på.. Så dere kan egentlig bare titte på den og se hva som skjer om dere trykker litt her og der

(trykker)

Intervjuer 2: Gjør opperksom på kartet

Intervjuer 2: dere må bare snakke

Elev 2: huff... *latter*

Intervjuer 1: Husker dere at dere skrev ned klokkeslett og slikt?

Elever: Ja

Elever: *prater lavt med hverandre*

Intervjuer 2: Fikk dere skrive om hva dere ville?

Elever: Ja, nesten

Intervjuer 2: nesten?

Elever: ja, måtte skrive om noe sånn sosialt

Intervjuer 1: Hvis dere ser mellom kartet og teksten, så ser dere en tidslinje.. se om det går å gjøre noe med den.

Elever: ja... å! *liten latter*

Intervjuer 2: Har dere vært på mange sånne turer?

Elever: nei, ikke sånne her

Intervjuer 2: har dere laget sånne historier før, ikke med data, men med bilder?

Elever: nei...

Intervjuer 2: Jeg så noen andre som hadde laget en historie utenfor kontoret til rektor, noen som hadde laget sånn en... Det var ikke dere det?

Elever: nei...

Elever: *prater lavt med hverandre*

Intervjuer 2: Savner dere noen bilder? hva?

Elever: ikke noe bilde av jernbanen

Elever: *uklart hva de sier*

Intervjuer 2: riktig.

Intervjuer 2: Hva synes dere om historien deres da, ble den fin?

Elever: Ja

Intervjuer 2: Noe dere savner? Er alt med?

Elever: Ja...

Intervjuer 1: Hvordan var det dere laget historien?

Elev 2: Vi byttet på å skrive og lagret på fronter.. så skrev den som ville

Intervjuer 2: av dere tre eller?

Elever: ja

Intervjuer 1: så dere skrev sammen alle tre?

Elever: Ja

Intervjuer 2: Men, dere tok ikke bilder?

Elever: Jo, men har ikke kabel til mobilen, så fikk ikke sendt over til dataen, men fått ny nå da

Intervjuer 2: hadde det vært ålreit om bildene dere tok hadde kommet med?

Elever: ja... Vi tok av bygdetunet

Intervjuer 2: det var heller ikke med?

Elever: jo

Intervjuer 2: har dere tatt noen av bildene her eller?

Elever: nei...

Intervjuer 1: Dere kjenner igjen turen?

Elever: Ja.

Intervjuer 2: Men når dere var ute på tur, hvordan bestemte dere hva som skulle være med? Var det dere som bestemte, eller var det læreren som bestemte, eller hvordan var det? Hva skulle dere gjøre egentlig? Kan dere fortelle om det?

Elev 3: vi skulle gå rundt rakkestad, ogithink så hver gang vi stoppa så skulle vi skrive ned tiden... ogithink så skulle en gruppe skrive om det stedet.

Intervjuer 2: Ok? Også ta bilder?

Elever: Ja.

Intervjuer 2: Var det dere som bestemte hva det skulle tas bilder av, eller var det læreren?

Elev 3: Vi var med å bestemte vi også

Intervjuer 2: Hva bestemte dere da? Husker ikke?

Elev 3: Bestemte hva vi skulle ta bilder av da, men det måtte være innenfor temaet da

Intervjuer 2: Og temaet var?

Elev 2: Stedet vi var på.

Intervjuer 2: stedet, Rakkestad? hus i rakkestad?

Elever: ja.

Intervjuer 2: Men dere kjenner igjen historien?

Elever: ja

Intervjuer 2: Er det deres historie, eller er det andres historie? der har ikke laget alt dere?

Elever: nei

Intervjuer 2: men dere kjenner igjen... åssen er det å lage historier sammen med andre? er det vanskelig?

Elever: nei, alle har litt idéer. blir fortere ferdig

alle ler

Intervjuer 2: Mange ting som mangler?

Elever: ikke så ille

Intervjuer 2: hva mangler da?

Elever: bilde av jernbanen. ellers er alt der.

Intervjuer 1: var det noen som skrev om jernbanen?

Elever: ja, men husker ikke hvem

Intervjuer 2: Hva lærte dere av dette da?

Elever: *ler*

Intervjuer 2: var det ålreit å jobbe sammen?

Elever: Ja!

Intervjuer 2: Var det morsomt?

Elever: Ja!

Intervjuer 2: Hva var mest morsomt da, var det snøballkrig eller å lage historie?

Elever: snøballkrig

alle ler

Intervjuer 2: men dere har ikke gjort noe sånt før altså

Elever: nei.

Intervjuer 2: skjønner dere hvordan programmet fungerer?

Elev 2: jaa...

Elever: kan dere fortelle åssen det fungerer?

Elever: vet ikke helt...

Intervjuer 2: nederst er all teksten, alle bildene.. også har du noe ovenfor?

Elever: kart...

Intervjuer 2: Hva vises på kartet?

Elever: alle stedene vi har vært...

Intervjuer 2: når man trykker på de, så...

Elever: ..kommer man dit.

Intervjuer 2: og under kartet?

Elever: tidslinje!

Intervjuer 2: ja, det vet dere hva er for noe?

Elever: ja

Intervjuer 2: har dere sjekket den, hvordan den funker?

Elever: ja

Intervjuer 2: Der kan dere se....

Elever: stedet vi var.

Intervjuer 2: Sjekket pilene helt borterst der?

Elever: de?

Intervjuer 2: hva skjer da?

Elever: kommer minutter og...

Intervjuer 2: Så hvis dere hadde vært på mange turer, så kunne alle vært på kartet...

Intervjuer 2: åssen er det å lage historie sammen da, synes dere det er rart at andre skriver om det dere har opplevd?

Elever: nei...

Intervjuer 2: det er ganske greit?

Elever: ja.

Intervjuer 2: Hvorfor ble det ørken der?

Intervjuer 1: Mangler nett...

Intervjuer 2: Du får gå tilbake så du finner kartet... (zoome)

Intervjuer 1: Trykk på en tekst... Focus

Elever: sånn.

Intervjuer 1: Så kan du zoome inn på kartet, trykk på +

Elever: sånn?

Intervjuer 2: Ja... Dere var fornøyd med turen stort sett?

Elever: ja

Intervjuer 2: ikke kjedelig?

Elever: nei...

Intervjuer 2: Hva kan bruke et sånn verktøy til hvis man hadde mobilen sin, hva kunne man bruke det til i skolen og ellers, ta bilder mobilen og sånn?

Elever: filme ting...

uklart

Intervjuer 2: synes dere det var bra?

Elever: ja..

Intervjuer 2: hva var dårlig da? at det ikke var noe bilde av jernbanen?

Elever: ja.

prater om kakene til Baker Dahl

Intervjuer 2: dere var veldig mye i sentrum? ikke noe bilde av skolen?

Elever: Jo, der.

Intervjuer 2: tror vi er ferdig der. Takk skal dere ha!

Bruker tid på å scrolle teksten og se på bildene. Bruker ikke kart og tidslinje i særlig grad, måtte gjøres oppmerksom på disse. Skjønte hvordan de fungerte.

A.3.2   Session 2

3 pupils, 2 teachers, 2 interviewers. No internet connection, so zooming maps did not work.

Intervjuer 2: Hva har dere skrevet om da?

Elever: Mølla. Var ingen ting om den da. Stod ingenting.

Intervjuer 2: Har dere tatt med det dere har skrevet?

endel støy, bla. om CCCP på genseren

flytter litt så kamera skal se skjermen

Intervjuer: Der er dataprogrammet, med turen. så kan dere trykke litt rundt og se hva dere finner ut

scroller opp og ned, prater lavt med hverandre, ler

Intervjuer 2: ligger på nett, så nå kan foreldrene se hvor søte og snille dere er på skolen

Elever: *ler*

Intervjuer 2: ikke noe snøballkasting på skolen, har jeg hørt

Elever: *ler*

Elev 1: Der er jeg!

Intervjuer 2: dere må bare leke litt med det, mange ting man kan gjøre om man trykker litt

Elev 3: zoome inn litt da, på kartet

Intervjuer 2: se om dere skjønner hvordan det funker

Intervjuer: ikke zoom så mye på karet, for vi har ikke nett, så vi har bare det kartet som er der

Intervjuer 2: Hvorfor skulle dere ut og ta disse bildene da?

Elev 2: var noe prosjekt vi hadde

Intervjuer 2: hvorfor skulle dere det? eller var det snøballkastetur dere var på egentlig?

Elever: *ler* var vel litt av hvert

Intervjuer 2: Hvorfor skulle dere ta bilder av rakkestad?

Elever: Vi skulle skrive om forskjellige ting, forskjellige steder i Rakkestad

Intervjuer 2: Blitt by?

Elever: jo (ikke riktig..)

Intervjuer 2: hvem valgte stedene dere skulle på da?

Elever: Lærer 2...

Intervjuer 2: Fikk ikke dere være med å bestemme?

Elever: nei *ler* Jo, bestemte at vi skulle ha snøballkrig

Intervjuer 2: Ja det er jo en viktig del av Rakkestad

Intervjuer: Har dere laget noen slike historier før, at dere har vært ute og tatt bilder og sånn?

Elever: nei, ikke som jeg husker iallefall

snakker om filmingen

Intervjuer: Hvordan var det dere lagde dette, hva lagde dere? tok dere bilder, skrev dere?

Elever: vi gjorde vel begge deler...

Elev 1: du vet vel det du, du var jo med

Intervjuer 2: men hva tok dere bilder av da?

Elever: mølla

Intervjuer 2: skrev dere om mølla også?

Elever: ja, men fant ikke så mye stoff. fant ikke ut hva den het engang.

Intervjuer 2: fant ikke så mye stoff? mølla er høy, den er full av iskrem

Intervjuer 2: men fortell hvordan klassen gikk fram for å lage historie, hvordan jobbet dere med det?

Elever: vi fikk beskjed om at vi skulle ut og gå, så skulle vi skrive om det der

Intervjuer 2: og det skrev dere når dere kom hjem?

Elever: ja

Intervjuer 2: også fikk dere beskjed om å lage 10000 snøballer?

latter

Intervjuer 2: Kjenner dere igjen historien?

Elever: ja

Intervjuer 2: var det sånn den var?

Elever: ja

Intervjuer 2: eller?

Elever: sånn tålig

Elev 2: der er jeg...

Elev 1: Jeg spiste jo kjeks jeg også, hvorfor er ikke jeg med på bildet?

Intervjuer 2: er det for få bilder?

Elev 1: ja, jeg er bare med på 3 bilder

Intervjuer 2: Lærte dere noe av turen da?

Elev 1: ja, snøballkrig er gøy!

Intervjuer 2: men, fortell hvordan dere jobbet i gruppa? nå husker ikke vi hva dere har sagt, så bare fortell... hadde dere mobilkamera? hva hadde dere, hva gjorde dere?

Elever: brukte vanlig kamera, de bildene der iallefall

Intervjuer 2: og så?

Elever: når vi kom til skolen, begynte vi å lete etter info på nett om kornsiloen, men fant ikke så veldig mye

Intervjuer 2: og så?

Elever: da gjorde vel Elev 1 resten.

Intervjuer 2: hva gjorde Elev 1?

Elev 1: fant ikke så mye, så måtte skrive litt fra fantasien.

Intervjuer 2: men det var etter at dere hadde vært på tur, ikke sant?

Elever: ja

Intervjuer 2: men mens dere var på tur, hva gjorde dere da?

Elever: tok bilder av kornsiloen og lekte

Intervjuer 2: bare av kornsiloen?

Elever: ja, for det var den vi hadde

Intervjuer 2: hva synes dere om det de andre har skrevet?

Elever: de har skrevet mye mer enn oss.

Intervjuer: men dere kjenner igjen historien, turen dere var på?

Elever: ja

Intervjuer 2: og det var en hyggelig tur?

Elever: ja.

Intervjuer 2: Hva synes dere om programmet, skjønner dere hvordan programmet fungerer?

Elever: Ja.

Intervjuer 2: kan dere fortelle hva de forskjellige delene er? øverst er det et..?

Elever: kart.

Intervjuer 2: og det viser?

Elever: stedene vi var.

snakker om google earth

Intervjuer 2: og under der er det?

Elever: bilder...

Intervjuer 2: mellom bildene og kartet?

Elever: tidslinje.

Intervjuer 2: hvordan funker den da?

Elev 1: ser hvor vi var når.

Intervjuer 2: testet?

Elever: nei...

tester tidslinja

Elever: nice...

Intervjuer 2: skjønner ikke så mye?

Elever: jo!

scroller til 2010

Intervjuer 2: prøv å trykke på en ballong du... sånn ja!

Intervjuer 2: så hva forteller tidslinja?

Elev 1: hvor vi var når.

Intervjuer 2: riktig. Er det flere typer prosjekter dere kunne tenkt dere å gjøre sånn her?

Elever: ja.

Intervjuer 2: for eksempel?

Elever: hmm...

Intervjuer 2: vanskelig å si?

Elever: ja, veldig vanskelig.

Intervjuer 2: *forteller at den ligger på nett, sinna bestemødre og lommepenger*

Intervjuer: ferdig.

A.3.3 Session 3

2 pupils, 2 teachers, 2 interviewers. No internet connection, so zooming maps did not work.

Intervjuer 2: kjenner dere igjen turen?

Elev 2: Ja *fniser*

Intervjuer: Hvordan lagde dere historien, hvordan jobbet dere?

Elev 2: Vi hadde om bakeriet, så det var ikke så mye å finne, vi lette på internett. Så vi måtte bare skrive åssen det så ut og sånn. Men det var morsomt da.

Intervjuer 2: Hva var det som var morsomt?

Elev 2: å gå rundt i rakkestad og ha snøballkrig!

Intervjuer: men dere skrev en tekst sammen?

Elev 2: ja

Intervjuer: Tok dere bilder også?

Elev 1: nei, vi hadde ikke kamera

Elev 2: det var andre som tok.

Intervjuer 2: dere må gjerne bruke programmet og finne ut hvordan det funker. det er mer enn bare... kart og sånn, se hvordan det funket

Elev 2: trykke på et sted her?

Intervjuer 2: ja, det blir jo ikke ødelagt, ikke noe som går i stykker

trykker

Intervjuer 2: skjønte du åssen det funka?

Elev 1: ja...

Intervjuer: ser dere at det er noe imellom kartet og teksten også?

Elever: ja...

Intervjuer: Hva er det for noe?

Elev 2: Oi... Her?

Intervjuer: Nei, mellom bildene og kartet.

Elev 2: åja... det vet jeg ikke hva er for noe...

Intervjuer: Prøv å trykke litt og se...

Elever: å, hvor vi var når!

Intervjuer 2: *uklart*

Intervjuer: se om det går an å gjøre noe mer..

Elever: *scroller tidslinjen*

Intervjuer: Skjønner dere hvordan det virker?

Elever: ja

Intervjuer 2: men kan dere fortelle litt, det var et prosjekt dere hadde, sant?

Elever: ja

Intervjuer 2: hva var det det handlet om da?

Elev 2: rakkestad

Intervjuer 2: hva var det dere skulle gjøre for noe da?

Elev 2: vi skulle gå rundt i rakkestad og skrive ned klokkeslett og notere, se på ting. skrive.

Intervjuer 2: hvorfor skulle dere gjøre det da?

Elev 2: vi skulle dele oss i gruppene og skrive en tekst til hvert vårt sted.

Intervjuer 2: hvorfor?

Elever: vet ikke...

Intervjuer 2: Vet ikke? hva var det prosjektet handlet om da?

Elev 2: Rakkestad

Intervjuer 2: Steder i rakkestad?

Elever: ja

Intervjuer 2: Hvordan synes dere den måten å jobbe på var da, var det ålreit?

Elever: ja..

Intervjuer 2: eller var det snøballkrigen som var morsom?

Elever: det var morsomt begge deler da

Intervjuer 2: kjenner dere igjen historien ut fra det de andre har skrevet da?

Elever: ja.

Intervjuer 2: synes dere det er rart å skrive på en historie som andre skriver på?

Elev 2: nei, egentlig ikke

Intervjuer 2: men dere kjenner dere igjen, ikke noe gærnt?

Elever: nei

Intervjuer: er det noe som mangler?

Elev 2: neei... eller jo, jernbanen kanskje? de hadde skrevet, men glemte å levere

Intervjuer 2: synes dere det tok lang tid før dere fikk skrive teksten eller?

Elev 2: nei, eller... det tok ikke så lang tid. vi hadde egentlig tenkt å intervju de på baker'n, men så ringte vi også var de sur på oss. skrek inn i telefonen at vi ikke fikk intervjue. også snakket vi med

dattera til de som eier

snakker om hun som var sur

scroller teksten og klikker på kartet

Intervjuer 2: åssen synes dere det er at andre får se det dere har skrevet da?

Elev 2: vet ikke, kommer an på *uklart*

Intervjuer 2: nå ligger det på nettet, så nå kan alle se det.

Elev 2: nei? ja, hvis de vet adressen så

Intervjuer 2: søker du på rakkestad nå, så kommer dette opp. hva synes dere om det da, at andre leser det dere har skrevet?

Elev 2: Morsomt. har egen side på internett, men ikke lagt ut noe sånt noe

Intervjuer 2: men det er greit at andre før se skolearbeidet deres?

Elev 1: ja.

Intervjuer: dere har ikke vært ute på tur før og skrevet og tatt bilder?

Elev 2: nei... vi kan ha vært et sted og kanskje tatt bilder og skrevet i en logg eller noe, men det blir ikke som dette.

Intervjuer 2: hva er forskjellen da?

Elev 2: det var bare at vi skulle skrive logg på skolen

Elev 1: da måtte vi skrive hver dag vi var der

Elev 2: det var på en måte mappeoppgave da.

Intervjuer: da skrev dere hva som hadde skjedd?

Elev 2: ja, hva vi hadde gjort

Lærer 2: da hadde det vårt kjekt å sette det inn i dette programmet, så det ble en hel historie. at vi kunne brukt det samme programmet da.

Elev 2: det tror jeg ikke vi hadde klart...

Intervjuer: synes dere det var lett å bruke? hvordan virker programmet?

drar tidslinja

Intervjuer: dere skjønner hvordan det virker nå?

Elever: ja

Intervjuer 2: så hvordan virker det da? kartet er...?

endel småprating

Intervjuer: hva viser ballongene da?

Elever: hvor vi har vårt hen.

uklart

Intervjuer 2: har dere vært på google earth før?

Elever: ja.

snakker om google earth

Intervjuer 2 snakker om å legge ut automatisk med sms osv., uten å få noe særlig respons

Intervjuer: ferdig.

Kommentar: problemet med tidslinjen (spesielt) virker ikke å være hvordan de skal bruke den, men de er rett og slett ikke oppmerksomme på at den er der.

A.3.4   Session 4

4 pupils, 2 teachers, 2 interviewers. No internet connection, so zooming maps did not work.

Intervjuer 2: Bare lek litt, se om dere kjenner dere igjen på historien

scroller

Intervjuer 2: kjenner dere igjen turen?

Elever: ja

Intervjuer 2: var det en hyggelig tur?

Elever: ja

Intervjuer 2: Hva var det som var så hyggelig med turen da?

Elever: det var jo litt pga. snøballkastinga.

Intervjuer 2: døpte dere lærern også?

Elever: nei...

snakker litt om snøball

Intervjuer: hvorfor dro dere på tur?

Elever: vet ikke...

Intervjuer 2: snøballkrig?

Elever: Her er den du skrev..

Intervjuer: hva skulle dere gjøre, i tillegg til å ha snøballkrig?

Elev 4: ta bilder og skrive om det vi gjorde og sånn

Intervjuer 2: hvorfor skulle dere gjøre det da?

Elev 4: vet ikke jeg?

Elev 3: det var vel bare for å lære litt om hvordan det er i rakkestad

Intervjuer 2: skrive om de forskjellige husene i rakkestad?

Elever: ja

Intervjuer 2: hva skrev dere om?

Elev 4: jeg og Elev 3 skrev om det sosiale på bygdetunet

Intervjuer 2: hva gjorde dere for noe sosialt på bygdetunet?

Elever: snøballkrig!

Intervjuer 2: hva skrev dere to om?

Elever: vi skrev om midtstuen. et kunststed.

Intervjuer 2: hva skrev dere om midtstuen da?

Elever: her er bilde av midtstuen

Elever: vi skrev hva det var for noe

Intervjuer 2: det stod ikke så mye om midtstuen?

Elever: nei... *leser høyt*

Intervjuer 2: skrev dere ikke mer, eller har læreren fjernet det?

Elever: vi skrev ikke mer, fant ingen ting

Intervjuer: ser dere mer der enn bare teksten og bildene?

Elever: kart

Intervjuer: prøv å trykk litt og se hva som skjer

Elever: ahaaa...!

Intervjuer: hva viser kartet?

Elever: hvor de forskjellige stedene er hen!

scroller i teksten

Intervjuer: ser dere under kartet også, så er det noe annet?

Elever: den? *drar tidslinja*

Elever: Klokkeslett ja!

Intervjuer 2: skjønte dere hva tingen mellom kartet og bildene er for noe da?

Elever: det er når vi...

Intervjuer 2: klarer dere å bruke den?

Elever: *drar tidslinje*

Intervjuer 2:ja, riktig

Intervjuer 2: når dere lager en historie sammen, synes dere det er rart at andre skriver om det dere har vært med på?

Elev 4: det er gøy da...

Intervjuer 2: hvorfor er det gøy?

Elev 4: andre får *uklart* ting sånn

scroller tekst

Intervjuer 2: hvorfor skrev dere så lite om midtstuen da? fant dere ikke så mye på nettet?

Elever: nei..

Intervjuer 2: hva synes dere om historien da? ble den fin?

Elever: *nikker*

Intervjuer 2: hva var fint med den da?

Elever: heh...

Intervjuer 2: var det fint å se seg selv?

Elever: det lå bilder under teksten... den følger liksom med

Intervjuer 2: dere kjente dere igjen

Elever: ja

Intervjuer 2: mange fine bilder... snøballer.

Elever: *ler* der er deg elev 3!

Intervjuer: ferdig.

A.3.5   Session 5

2 pupils, 2 teachers, 2 interviewers. No internet connection, so zooming maps did not work.

Intervjuer 2: versågod, se på turen deres. husker dere at dere var på tur?

Elever: ja.

Intervjuer 2: var det kult?

Elever: ja

Intervjuer: kjenner dere igjen?

Elever: ja

Intervjuer 2: hva kjenner dere igjen da?

Elever: alt

Intervjuer 2: noe som mangler? litt for lite snøballer kanskje?

Elever: skulle hatt noe fotball også

Intervjuer 2: spilte dere fotball?

Elever: nei

snakker om snøballkrig

Intervjuer 2: skjønner dere hvordan programmet fungerer?

Intervjuer: ser dere det er kart? Hvordan virker det?

Elever: man får opp hvor man har vært

zoom virker ikke pga. manglende nett, litt knot

Intervjuer: ser dere det er noe under kartet?, prøvd å trykke på det?

Elever: åja!

klikker på punkter på tidslinjen, går tilbake til å scrolle tekst

prater om midtstuen

Intervjuer: Hva lagde dere i historien?

Elev 2: vi fikk ikke levert vårt, han var i syden og jeg var syk

Intervjuer 2: hva skulle dere skrevet om da?

Elev 2: rakkestad stasjon

Elev 1: hva skjer om man trykker på focus da?

Intervjuer: bare prøv

prøver

Intervjuer 2 forklarer

Elev 1: er jeg på den grønne nå da eller?

Intervjuer 2: ja.

Intervjuer 2: hadde dere vært på lang tur, kunne det blitt bra. sydentur. starter på gardermoen, osv.

Intervjuer 2: skjønte dere hvordan tidslinja funker da?

Elev 1: ja, nå man klikker på den så kommer man der man var

Intervjuer 2: prøvd å dradd i den da?

Elev 1: å...

Intervjuer 2: skjønner?

Elever: ja.

Elev 1: kommer ikke mye hvis man går over klokka 2

Intervjuer 2: nei, da var jo turen slutt

Intervjuer 2: hva synes dere om at andre lager historier dere har vært med på?

Elev 2: nei.. bare det er riktig det som står, så er det ikke så ille farlig

Intervjuer 2: føler dere at det er deres, dere kjenner igjen historien, det er den dere var med på?

Elev 2: ja. jeg var bare med til vellhaven da.

Elev 1 peker på kartet, småprater, finner skolen

Elever: påpeker at det siste bildet ble tatt før turen startet

En person fra skolens administrasjon kommer innom og blir vist historien og programmet av elevene