Storification in history education: a mobile game in and about medieval Amsterdam

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Abstract

The aim of this study is to analyze a mobile and multimedia game designed for history education in terms of how it is designed and how it functions as a narrative learning environment. In history education, narrative can be argued very useful to overcome fragmentation of knowing historical characters and events, by relating these with meaningful connections of temporality and sequence (storification). In the game studied pupils explore the history of Amsterdam by walking in the city, experiencing characters, buildings, and events, while using UMTS/GPS phones for communication and exchange of information. The history game was played by 10 secondary school classes of 23 pupils on average. The game lasted one day and was played in four or five-person groups. All exchanged information during the games was collected, the game play was observed by team coaches and researchers, and the introduction and closing session of the game day were video taped. The design of the game as well as the actual gaming process was analyzed with respect to how it evokes three types of storification: receiving (spectator), constructing (director) and participating (actor) story. Results show that the game evokes a mixture of these three types of storification. Moreover, it shows that the storification processes can be placed on a dimension of interactivity. Though particpating story in the game seems to evoke more interactivity which leads to motivation, constructing story seems to evoke more awareness of the whole story, also leading to motivation.

Narrative has long been recognized as a valuable means for structuring and giving meaning to experiences (Hermans & Hermans-Jansen, 1995). Besides, it allows knowledge to be constructed and presented in meaningful entities. "From a perspective centred on learning, one can .... take a view of story as a process of internal structuring of experience; of sense-making via narrative organization. (Aylett, 2006, p. 6)" In line with Aylett, we call this process storification. Hence, she continues "story is not so much the novel, play or film as the internal structure that results from reading or watching" (p. 6).

Storification not only involves experiencing story, but simultaneously making sense of the experience. According to the definition above, this includes 'internal structuring' or 'narrative organization'. Narrative can be seen as a way of organizing episodes, actions, and accounts of actions in time and space (Sarbin, 1986). More specifically, Aylett types stories as an interplay between character and causation (Aylett, 2006). As she notes, characters relate to aspects of personality, emotional state and social standing, which is linked to causation via motives, intentions, plans and actions. Causation denotes issues as temporality and sequence, and is linked to characters by events and their outcomes. In addition to character and causation, it is important to point out the tools that mediate this interplay (Wertsch & Toma, 1995). Tools mediate on the one hand the motives, intentions, plans and actions of characters, and on the other hand mediate events and outcomes. As such, we come to an interplay between character and causation, mediated by tools, that constitutes narrative organization or internal structuring. This can be pictured as in

Figure 1. 'Making sense via narrative organization', entails the process of creating a story line (causation) by linking characters, to their motives, intentions, plans and actions, to events and outcomes and to tools mediating this interplay.

[Insert Figure 1]

Reading or watching is but one way of relating to story. Dettori, Giannetti, Paiva and Vaz (2006) described how there are various uses of narrative possible in learning environments: receiving story, constructing story and participating story. Reading and watching are examples of receiving story, as the story has been defined by others, and is self-explanatory to the pupil. The story is fixed and defined by others than the pupils, and they can listen or look at it, but not influence it content-wise. The pupil is no part of the story, but acts as spectator. The storification process in these cases entail paying attention and reconstructing the narrative message that is presented. In contrast, when the learning environment entails

constructing a story, the pupil defines the story in the role of author. Storification in this case entails building the narrative structure, and deciding upon the story elements in it. A third use of narrative is participating in story, turning the pupil into an actor. The story is bodily experienced and created in a process of living or playing it 'in real time'. Storification is then a process of acting out the story and the story elements. These three uses of narrative in learning environments can be perceived as various forms of storification, that is, as three ways of experiencing story. They could be placed on a dimension of interactivity with receiving story as the most passive, and participating as the most interactive form of storification.

The aim of this study is to analyze storification processes evoked by a mobile and multimedia game that was designed for history education. Using narrative to learn the history of medieval Amsterdam seems to be an obvious choice. As Hermans & Hermans-Jansen (1995), based on the work of Sarbin (1986), pointedly describe:

"... both the historian and the novelist can be considered narrativists. The historian relates stories about presumably actual events influenced by... Since history can only be written on the basis of incomplete data, historical reconstruction is not possible without imagination. The novelist on the other hand, writes about fictive characters in a context of real-world settings and with a certain degree of comprehensibility....Historical and novelistic narratives make use of both "facts" and "fictions". Not surprisingly, story and history are etymologically related." (p. 8). Narrative can be argued relevant for history education, as it is a valuable means to move beyond knowing fragmented facts of historical figures and events. In addition, games are being recognized as fruitful narrative learning environments (Jenkins, 2004), which make it possible for pupils tot learn in a realistic way about certain topics (Shaffer & Gee, 2006). Given the changes in society, and constructivist approaches towards learning, it becomes important that childresn not only learn by receiving knowledge, but also by searching and making knowledge. In line with this is an approach towards learning in which pupils do things that matter to them en to the society. Games seem appropriate means to learn in a meaningful way. (Prensky 2003; Shaffer, Squire, Halverson, & Gee, 2005). Gee (2005) denotes that games make it possible to centralize the learner, to emphasize problem solving, and to perceive learning as a proces of understanding

Case study: the mobile history game

The game studied is called 'Frequentie 1550', and addresses the city of Amsterdam in late medieval era. It was developed by the Waag Society [http://freq1550.waag.org], and was

piloted in 2005 (see Admiraal, Raessens, & Van Zeijts, in press). Though it has won a price of world's most innovative e-learning application, it has not yet been studied systematically. The mobile game is a one-day activity meant for secondary school pupils to actively experience the history of Amsterdam by walking through the city, receiving messages, experiencing buildings, completing game assignments, while using UMTS/GPS phones for communication and exchange of information with team members in the so-called 'Headquarters'. As has been argued by Raessens (in press) this game is a good example of what Jenkins (2004) calls 'spatial games', that are typically designed as 'narrative architecture' or 'environmental story telling'. This mobile game creates a rich narrative learning environment in which pupils partly receive, partly construct and partly participate in the story during the game. How these forms of storification are interrelated in the game and what kind of storification this evokes by the pupils is central to the analysis.

Game structure

Before the pupils start playing the game, the game is introduced by contextualizing it in a broader story line (back story), at the main location of the game [The Waag of Amsterdam]. Following, the structure of the game is explained to the pupils, pointing out that there are six sectors and explaining the three types of assignments for each sector.
The team structure of Head quarter and City teams is explained, as well as the media tools and their use for communication and exchanging textual, audio, and video information. The media structure is pictured in Figure 2.

[Insert Figure 2]

The game is played in groups of 4 or 5 pupils. Each group consists of a City team (CT) and a Head quarter team (HQT). During the morning two or three pupils of each group were located in the main building of the game. These groups formed the Head quarter teams. The other two or three pupils of each group formed the City teams. The second half of the day, these groups shifted, so that each pupil participated in the role of head quarter and city team.

Each CT is assigned one of the six zones as starting point, and, in order to obtain days, needs to conduct small location-based media assignments in order to explore, map and master the area and its theme. The Headquarter stays behind the computer at the main building, using internet as a resource for finding information, guiding the CT through the city, collecting

assignment material send by CT into a 'media box', and answering related questions. Both CT and HQT explore and master the city by means of a modern and a medieval map.

In the game the city has been divided into six sectors, each sector dealing with a different theme in medieval times. For example, trade is connected to the harbour area of Amsterdam, while defence is connected to the boundaries of the city. These themes, 'labour', 'trade', 'religion', 'rules and government', 'knowledge', and 'defence' are introduced to the pupils by means of an introductory video clip, that is sent to the UMTS video phone of a CT, and to the HQT video screen, as soon as the CT enters a specific sector. These clips present a description of medieval Amsterdam in that area related to the particular theme. The clips contain words that will help making the assignments.

Following the first video message of the sector, the CT needs to find the location of the hidden assignment, with help of the HQT. When arriving at the assignment location, both subteams receive text and assignment in three parts. The assignment is composed such that they receive an introductory text, followed by part 1 of the assignment and, after successful completion, additional theme-related text, part 2 and, again after successful completion, part 3 of the assignment. Successful completion of the whole assignment should result in a mixture of textual, pictorial and video answers provided by City team and Head Quarter. All assignment material needs to be send to and collected by the Head Quarter team and placed in a media box. There is an interdepency structure in the game so that based on the material to be send by the CT to HQT, the HQT needs to be able to answer questions. Only if they receive correct material and give the correct answer, a new assignment will given to the team. Vice versa, the CT is helped by information of the HQ found on the internet.

Each sector includes three types of assignments (each containing three parts):
- An orientation assignment, including texts and tasks that intend to trigger environmental awareness by creation or selection of photo's and answering questions about the site and imagination about the viewpoint, work or actions of historical figures by means of the CT acting and filming it [e.g. play to conduct the work of a shipbuilder, walk the route of a pilgrim in a procession, play to hang a person] and the HQ team selecting parts of the medieval map that indicate the work.
- An acting assignment, including texts and a task that again intend to trigger environmental awareness by creation or selection of photo's and answering questions about the site, but also imagination about historical actions, events or work of historical figures by means of the CT acting and filming sayings and HQ teams explaining in words sayings [e.g. "a hot iron"

meaning "it will be a big test", referring to 'the fire test' applied to test whether suspects were guilty or not].

- A deepening [verdieping] assignment, including texts and tasks for the team to select details of the site that represent a certain symbolic value, by means of the CT searching for and taking photo's of these details [e.g. take a picture of that plaque that refers to the medieval name of this area] and the HQ team selecting the correct ones from diverse pictures.

At the end of the day the teams present some of their collected media in a short closing group presentation. They tell something about a picture they took or about a video they made, for example what the saying they wanted to represent means.

Methods

Data

The history game is played by 10 school classes in three different schools for secondary education. These classes have an average of 23 pupils in the age of 12 and 13, varying in educational level from lower secondary professional education to pre-university education. The 230 pupils were randomly divided in groups of four (and sometimes five). As described in the game design, each group was divided in a City team (CT) and a Headquarter team (HQT) and the second half of the day these pupils shifted roles. In order to analyze the game design, various materials about and from the game were collected: game descriptions, outline of introductory and closing presentation, video messages, text messages and assignment texts in the game. In order to examine the storification of the actual game play, the following data were gathered for all groups during the 10 game days:

a. Observation notes of the researchers throughout the day about:

　　- the introduction to the pupils at the start of the game

　　- the involvement of HQ teams in the game

　　- the involvement of the coaches of the HQ teams

　　- the comments of pupils at the closing group presentations

b. Logs of the game including

　　- Exchanged files (text messages, documents, pictures in answer to the assignments) sent by mobile phones from and to 'head quarter'

　　- Walking path of students in the city

c. Observations forms completed by the coaches of the groups at both Head quarter teams and City teams, and a group interview with the coaches at the end of each game day. Topics of

both the observation forms and group interviews are pupils' involvement in both the subject and the game, their collaboration, and possible learning effects.

d. Video recordings of the group presentations of the pupils at the end of the day.

<u>Analysis</u>

In order to study the value of the game for learning by storification, the analysis concentrates both on how the game was designed as a narrative learning environment and how it was actually played as a narrative learning process. The research question specifically points to the 'historical storification processes'. This entails considering on the one side the construction of stories, and on the other hand the historically elements embedded in the storification process. With these foci, we conducted a content analysis by the following steps:

A.   We first looked at the design of the mobile history game and analyzed to the way in which the game supports three ways of experiencing story, respectively receiving a story, constructing a story and participating in the story. The game material was scanned and analyzed by the researchers, leading to the general game description in the introduction and to the more detailed discussion of the game in the results section.

B.   Second, guided by the results of the game analysis, we looked at the storification process of the students during the game, based on various data (game logs, observations during and after game by researcher and team coaches).

The transcripts of the recorded data were analyzed through a grounded-theory like process of content analysis, which involved reading an rereading the transcripts, listing the features of the game design associated with the three types of storification (receiving, constructing and participating a story). Three observers performed this content analysis and negotiated disagreements until the outcomes were agreed upon (cf., Marble, 1997). This narrative method of inquiry resulted in summaries of storification processes in the game design. For each aspect of the game design related to the three storification processes, empirical data about the actual game play was scrutinized and summarized. This procedure resulted in three transcripts which were the input for the text reported in the results section, adressing respectively Receiving story, Construcing story and Participating story.

Results

We present the game analysis by discussing how each of the three forms of storification is embedded in the game design, and accordingly, present empirical data from the game play about if and how the pupils picked up these elements in storification processes.

Receiving story

What narrative organization in the game is predefined by others, and is intended for reconstruction by pupils? The predefined story is contained in the back story of the game, which is partly told in the introduction to the game and elaborated by video and text messages. We will review these parts below. There are several aspects that seem significant for evoking storification for this part of the game experience. First, the game design asks pupils to pay attention by listening to or watching what the narrator tells. Second, it is based on credibility (are the pupils prepared to accept the narrator's perspective and is the narrator able to draw pupils into the world of the story?). The credibility is twofold as the story is fictional in that the characters are dead, events are not happening now, but real in the sense that it is describing what really had happened.

Being introduced to the back story

Before playing the game, all pupils are introduced to the back story by the game coach of the Waag society as follows:

> "*If you walk out the main door, imagine you walk into medieval times. Therefore you will also have a medieval map. You are going to try to become burgher of Amsterdam. Those who stayed in the city for one year and a day were a legitimate citizen and became burgher of the city. Hence, you will collect days instead of points. In the game one can earn 366 days. There is not a real possibility to collect this amount of days, because finishing the complete game takes too long. The team with the most days will win the game.*"

Clearly, this introduction involves some narrative organization, connecting the character of a burgher, to the intention of becoming citizen, and the action of staying 366 days in the city. Besides explaining this in medieval times, pupils are asked to imagine themselves as being burgher with this intention, and provided with a medieval tool (map of Amsterdam in medieval times). For the back story to succeed, it is important that pupils pay attention and that they are drawn into this main story line of the game.

The observations of both researchers and team coaches note that the pupils pay attention to the presentation of the game and the introduction of the story line, but also that they do pay more attention to the game to be played and do not take the story too seriously.

<u>Receiving messages from and about medieval time</u>

Both CT and HQT received similar video and text messages about the sectors and the themes that are connected to the sectors. The introductory video message that starts as soon as City team enter a sector gives an intro message, as if it is being sent from the year 1550. The specific area of the sector is shown on the medieval map, and the name of the area / sector appears in text, e.g. 'de Lastage'. Following, a range of words appear that are related to this sector (e.g. 'ropes', 'labourers', 'ships', 'defence tower', 'water') while the sound of the video represents the sound of the area (e.g. sound of manual work, sawing). Right after, the video shows and zooms in on a few pages from a diary. For the sector Lastage, it gives the following texts:

"Tuesday. A few sisters' dresses are worn out and I needed yarn. The best yarn one can find in the Lastage because there they make ropes of it. The Lastage is a long walk from the monastery, beause it lies outside the city wall. As soon as you leave the city wall, you hear the hammering from far, as in the Lastage hard work is conducted. The labourers who work on building and repairing ships always have black pitch stains everywhere. The wind blew hard so the smell of pitch and the salt seewater came to me. As a woman I still do not like coming there, but it has not been really unsafe anymore since the area is being protected by the new defence tower. That lies on the outer boundary of the Lastage. It stands on the intersection of the water of the Amsterl and the water of the IJ."

Following the diary pages, a closing text appears (as if from a main narrator):

"The hidden location is on the external border of the Lastage. It is on the intersection of the water of the Amstel and the water of the IJ. The hidden location is a tower on the eastside of the Lastage."

The video recordings are like micro narratives that introduce the location area, the work conducted in this area by certain figures (in this example labourers), and under certain circumstances. The diary introduces the perspective of a person in the year 1550, and invites readers to sympathize with the person by describing intentions (e.g. need to buy yarn), actions and sensed reality (e.g. smells, sense of safety, weather experience). In the video messages, the words, diary text and closing text repeat the main concepts and include signs that point to

the hidden location. In the introduction to the game, pupils were advised to pay attention to the video messages, as these contain clues that help to proceed. Whether they did that, differed very much between teams and classes. Few teams were very active writing everything down from the video-messages, but most teams, particularly the City teams, barely watched the video. The little attention for the video-messages received illustrated their focus on playing the game, and their lack of focus on the historical narrative embedded in these messages.

When arriving on specific assignment locations, the pupils received text messages. Again these text messages are like micro narrative structures. Consider the following texts for the first assignment:

> Part 1: "*In the middle ages is the Lastage the industrial zone of the city. For a long time the labourers work in dangerous circumstances in the Lastage, as it lies just outside the city wall. In 1516 this tower is being build to protect the labourers.*"
>
> Part 2: "*The labourers in the Lastage work hard. The main part is the shipyard, where ships are being build and repaired. The Montelbaanstower only build after the Lastage is being attacked and burned down by the duke of Gelre.*"

These texts further introduce the location area, and the work that was being conducted by certain figures (labourers) in this area, also pointing to the circumstances. Most of the texts also refer to a specific historical figure, (the Duke of Gelre in the example above), and to specific events and outcomes (e.g. attacking and burning down the area, building a tower).

The observations of the team coaches noted that pupils did not read the text messages very well most of the time. Sometimes the message for the CTs were difficult to read (too small, too much sunlight), but more generally most pupils were focused on completing the assignments (and collecting days of burghership). This was indicated by most pupils scrolling down to the last part of the introductory text to the first words of the assignments.

Constructing story

What narrative organization in the game is intended to be defined by means of pupils 'telling or writing', be it by extending existing stories or rewriting characters or events in new stories. The challenge in constructing story for pupils is that they are required to interpret, choose and organize story elements, deciding upon characters, events, etcetera. When screening the game, varying degrees or levels of authoring can be distinguished. The authoring process can be recognized most in the role and tasks attributed to the Head Quarter

teams, specifically in their searching and selecting information, answering questions, guiding CT players, and collecting material. We will review each of these tasks, discussing the game design and empirical data on the game play.

Searching for information

As can be seen in the Appendix of this paper, most of the assignments for the HQ teams involve searching for information. This is an authoring activity in that the information seekers are in control of creating parts of the story and its elements. For several questions in the assignments, the HQT were directly asked to look up information at a encyclopedia website (e.g. Wikipedia or historical site), for example:

"In Wikipedia you'll find more information about the guilds that were located in [de Waag]. Find out which guilds belong to which ebmlems. (http://nl.wikipedia.org/wiki/Waag_%28Amsterdam%29)"

As the various observations point out, searching information on the internet turned out to vary a lot between the teams. Most teams could manage finding information quickly, using the websites indicated in the assignment. A few teams even used internet sites which were not indicated, but could provide additional information. Some teams did not know which keywords to use or did not use key-words at all, just entering the complete question and then being frustrated while getting no results. As such, the search for information did turn out to contribute to constructing story only for those who had experience with or knew how to search information on the internet.

Answering questions

Distanced from the location, the HQ teams need to conduct three types of assignments (as is also the case for CTs). First, there is an orientation assignment to trigger environmental awareness. For the HQT, this assignment includes the task to select one out of three or four photo's that picture the site, that is (part of) buildings or area in that sector, a task to select parts from the medieval map that indicate the work being conducted in that area, and a question about the name or meaning of a something (building, location) or someone (historical character)? Second, each sector involves an imagination assignment, to trigger environmental awareness and imagination about historical actions, events or work of historical figures. For the HQT this assignment includes two similar kind of questions as in the orientation assignment, and an additional task to explain in words a specific historical

saying. Third, each sector includes a deepening assignment, that includes the HQ task to select pictures that represent certain details that carry symbolic value for the sector area.

With respect to storification, the assignments should together constitute an awareness of the sector area in terms of environmental structure ('the setting' of the story), and allows to learn about the work conducted in this area, linking locations to buildings and working artefacts, to intentions and actions. The imagination assignment, in particular the task of explaining a saying has the potential to evoke awareness of historical actions and events of general characters or historical figures. For example, the expression " een heet hangijzer", which can be translated literally as "a hot iron" means "it will be a big test". This meaning can be discovered by learning about the history that a fire test was sometimes applied by judges to test whether suspects were guilty or not.

When looking at the logs of the answers provided by the HQ teams, we find that most multiple choice answers were answered correct the first time, sometimes it took a few more attempts. The open text questions, among which were the explanations of the sayings, required more answering attempts of the pupils before giving the correct answers. Partly this was due to textual mistakes causing the computer to recognize the answer as wrong. The observation reports also indicate that the HQ teams were motivated and concentrated on the assignments most of the time and managed to make the assignments succesfully. This implies that the HQ teams understood the narrative linkages embedded in the questions, with the main theme of the sector as guiding principle in and between the questions.

Guiding CT

One other task of the HQ teams was to guide their own City team. This can be considered story construction in that they decide upon the routes that their team players can best walk to arrive at the assignment locations. As tools they could use both the medieval and modern city map.

In Figure 3. the medieval map as was beamed in the Head Quarter, is shown. All HQ teams could see how the different City teams (including their own CT) are walking through the city. The maps showed where specific assignments were located by means of flags. Moreover, the medieval map potentially 'sets the scene' for storification as it connects these assignments to historical information, as it shows important historical buildings (e.g. defence towers, city walls) but also the shipping activity at the harbour.

[Insert Figure 3]

The various observation reports note that there was a lot of communication between HQT and CT about navigating through the city. Often the HQT guided the CT towards the assignment locations, though a few City teams navigated their way through the city by deciding upon the routes themselves. HQT and CT contacted each other regularly, though not always productive. One difficulty was timing; sometimes the CT was in the middle of shooting a video, when the phone rang thereby ending the recording. Another difficulty, was that in most teams there was initially miscommunication. When guiding the CT it was very important for HQ to imagine themselves in the position of the CT (with respect to physical location in the city and location on the map), and they did not always do so. For example, the HQ team tells the city team to walk up (in case that the assignment is above the place on the map where the city team is), which does not make sense to the CT. North or west, or street names were more useful indicators, but less used. The productivity of the communication between the teams improved over time. The impression in the observations is that the medieval map was used intensively as tool to keep track of own and other City teams, and to have an overview of assignment locations related to a certain sector and its themes. As such it created a strong storification scaffold for the HQ teams in terms of functioning as a 'narrative architecture' in the game.

Collecting material

The HQT was not only responsible for answering questions themselves, but also for collecting the answers produced by the City team in the form of text or video messages or pictures sent by the media phones. The material sent by the CT did not automatically end up in the answering box, but had to be dragged by the HQ into the so-called 'media box' to count as an answer to the questions related to a specific sector. As such, the media box can be seen as a potential story board for the different sectors to be constructed by the HQT.

The media boxes of the groups that were logged show that the material collected for a sector was generally composed of both HQ team and CT answers following up each other. In the textual answers however, no explicit linkages were made by the HQ teams between the answers of the different questions, for example referring to the answer of the CT or to a previous answer. However, this was not a task in the game, so can perhaps not be expected from the pupils. An exception to this, are the assignments about historical sayings. When screening the assignment material produced by the pupils, the answers of both CT and HQ about the sayings appears to be linked most logically. Most often the explanation given by the

HQT underlined the video produced by the City team who enacted the saying, thereby implicitly co-referencing each other.

Though no explicit linkages between assignment were made by the pupils, the media box functioned for the HQ teams as a overview tool of the assignment material related to each sector. The media box was frequently used as a screen. Together with the medieval map, it appeared to be used as coordinative tool to switch between the different HQ tasks (searching for information, communicate with and direct the City teams, answering questions). In general, the HQ teams were very motivated during their play, which is probably due to the many different tasks, and to having responsibility and overview in the role of director.

Participating story

What narrative organization is defined and 'acted out' by pupils? The challenge of this form of storification is different than the other forms. First of all, it requires the pupils to plan, enact, and be aware of narrative elements. Especially the latter is a challenge, considering that many game elements carry historically relevant knowledge, but implicitly. Thereby they are partly fictional, and partly real (in terms of 'accepted as historically true'). Participation in story yields mostly for the CT, as they are supposed to enact parts of what certain figures in medieval times must have experienced by means of walking through the city, taking pictures or videos, and enacting sayings.

Walking through city

A large part of the City teams' activity was walking through the city in terms of historically relevant routes. The medieval map was provided to them as a tool, but did not have the modern map like the HQ team. The modern map pointed out the city structure as the CT saw and experienced it. Also unlike the HQ teams, the medieval map of City teams showed only one sector and no indications of the assignment locations, so the game was designed so that the CT needed the HQ teams to point out directions.

As the various observations report the CTs contacted the HQ teams very often to ask them how to walk. The medieval map turned out to be difficult for them to read: it was on a small screen and displayed the map different than usually (Up was South and down was North). Moreover, the medieval map did not represent the current situation and could show streets or water that are not there at present (and therefore making it difficult for the CT to interpret). As intended in the game design, interdepency in the group was created, as they needed communication with the HQ teams to be guided through the city. This can be seen in

the game as played, since it was observed that the CT is rather focused and dependent on the HQ for help, also being frustrated when this does not work out correctly. Compared to the HQ teams, the City teams show to have much less of an overview and sense of narrative structure. The lack of overview was further enhanced as walking through the city caused more time between the assignments and did involve much more than historical and game relevant issues. As the CT coaches reported, the pupils were several times distracted by people and traffic, shops, and were busy with the mobile devices. Accordingly, the historically relevant narrative is lost out of sight in favour of real experiences of these pupils in the daily life of the city.

Taking pictures and videos

Several assignments involved taking pictures or videos (see also Appendix 1), some of them requiring a specific angle from which to take the picture or video. A few task descriptions mentioned in addition to imagine the work of a character when doing this. For example make a video as if you walk the route of a pilgrim in a procession. This is a good example of what in the literature has been called 'perspective taking' (Järvelä & Häkkinen, 2002). The pupils are invited to literally take the point of view of historical figures, evoking imagination by vividly sensing reality in historical perspective. The analysis of the videos indicates that the assignments might have been too complicated. The video-assignments usually consist of a part in which the area that should be taped was mentioned, as well as a part about acting out the work of a character. Most pupils taped only one part of the assignment: they either taped the area or acted out something. Only very few pupils did both. The team coaches often report that the pupils do not read assignments carefully, so it could be the case that they did not see they had to do both. Generally, they kept the videos very short in order to avoid technical problems with sending it.

The 'perspective taking' in the videos varied a lot between the city teams. As the observations report and some video show, some tried very hard to make it as much consistent with history as possible. For example, one group asked in a church what nuns wore in that time, so they could try to look like nuns on the video. Vice versa, sometimes taking the medieval perspective seemed more difficult, and City teams called their HQ teams for help how to do this. Partly, the perspective taking intended in the game design did not succeed, as the pupils did not shoot the video from the standpoint from which the video is supposed to be made. For example, most pupils shot the footage of the tower instead of standing by it and making a video of the area *from the perspective of tower*. Again, this is likely to be explained by the fact that pupils do not read the questions and tasks carefully. Though these tasks

(taking pictures and making videos) were not as carefully undertaken as intended in the design, the communication within the city team and with the HQ team, indicate they were active and motivated to make these assignments in a serious manner.

Enacting sayings

As was mentioned before, the imagination assignment included the task for the CT to act out specific historical sayings that were related to the history of the specific sector in which the CT is located. This CT task can be considered as a highly interactive form of storification, as the CT is supposed to literally act out a historical practice, often also in the role of historical figures. The formulation of this task ('act out what this saying means') left aside whether the CT was supposed to enact the symbolic or the literal meaning. This twofold nature of the task was further created, as in most cases the sayings, though nowadays being considered as symbolic, are actually based on literal practices in history. In the game, both the literal and symbolic expressions in the video were considered to be correct. Whether or not the CT was able to point out symbolic value of saying was dependent on whether or not the CT asked or received explanation from their HQ team. However, in the assignment it was left open for CT to ask or HQ to phone about explanation before making the video. Accordingly, only when receiving explanation the CT was able to enact the saying symbolically, even though still having the opportunity to enact it literally.

A little bit less than half of the video's shows pupils acting out the saying symbolically. A more literal enactment is to seen in less than half of the videos. In other video's it is not completely clear whether it is a symbolic or literal enactment and in some other video's pupils did both.

With a few exceptions, the HQ teams knew the right symbolic value of the saying, but it was not possible for us to see whether the HQ team and the CT communicated about this symbolic value. So it is possible that CT acted out the saying without knowing what it meant and that that was the reason for acting it out literally. But it is also possible that the CT took the freedom the task left them (whether to enact literally of symbolically) and choose the way to enact that provided most opportunities for acting. For example the saying 'a hot iron' was easily acted out literally, but to act out the symbolic value (it will be a big test) can be considered much more difficult.

Both the videos and the short presentations of the groups at the end of the day in which they showed the videos to the other groups, point out that the pupils were very active and motivated in making these videos, though being shy about it at the same time. The activity

and motivation of th City teams seen in the videos and presentations stands in contrast with the observations that the City teams are not so involved in the game most of the time. This is likely due to the fact, that the video assignment about historical sayings more explicitly call upon the role of actor.

Conclusion

We have analyzed a mobile and multimedia game in terms of how it is designed and how it functions as a narrative learning environment. Generally, the results showed many parts in the game evoking narrative organization, which in its most elaborate sense calls for the pupils to link events to characters, to tools, and to buildings. Our analysis more specifically focused on the storification processes induced by the game. The design of the game as well as the actual gaming process was analyzed with respect to how it evokes three types of storification: receiving, constructing and participating story. Results show that the game is composed of a mixture of these three types of storification. The analysis revealed how different game elements infer different ways of how the pupils relate to the story, in terms of receiving it as spectators, constructing it as directors and participating the story as actors.

The game elements that can be considered receiving story are the introduction to the back story presented in the morning to all the pupils and the text and video messages sent to them at the assignment locations. As described, the observations indicate that the focus of the pupils with regard to these received narrative elements are more on the game and what was needed to win this game, and not on the historical content.

As is reviewed in the results section, the game elements that can be considered representing constructing story are all related to the role of the Head quarter teams, who collected, coordinated and directed the game. The information searching was one such task, and most teams knew how to use it effectively as resource. Answering questions was another task that most HQ teams fulfilled successfully. The correct answers indicate they took up the linkages embedded in the questions. The most directive task was to guide the City teams through the city. The medieval map they use as tool functioned both as game overview, showing where the City team walked, being historically informative, and relating the assignment locations to sectors and their main themes; and as such functioned as narrative architecture. In addition, the HQ teams were responsible of collecting answers into a media box that functioned as a story board, in the sense of providing overview of assignment material and the according narrative elements related to each sector. In general, the HQ teams

were very motivated during their play, which is probably due to the many different tasks, and to having responsibility and overview in the role of director. As the results section describes, the participating storification processes induced by the game is connected to the role of the City teams who walked through the city, made location based assignments that consisted of taking pictures and making videos and enacting sayings. The results described indicate that these activities were motivating for the pupils to 'act'. At the same time, due to subordination to HQ directions, distractions of the modern street life faced when walking around, and the amount of time between the assignments, the City team had a lack of overview of the game and of its narrative structure.

Comparing these three storification processe, we can say that both constructing and participating are processes in which the learner is authoring the story and that both represent certain interactivity. This can be argued much in line with a constructivist approach to learning. In the case of participating, the interactivity can be considered higher than in constructing, as the story is being literally acted out and 'lived', and buildings, viewpoints and activities of historical characters are physically experienced. However, based on the findings, we can also say that in case of participating, the focus of the pupil is also attracted to all what is happening there and now. While trying to find their way through the city, searching for assignment locations and conducting assignments, they loose sight of the overall structure of the game and its narrative. As Aylett pointed out in relation to experience of participation (p. 9): "Participation is also a totally different experience from spectating, since the commitment to act (having to decide what to do next) and the necessarily partial perspective of a specific character radically changes the input to the storification process." Apparently, the bird perspective that one has in case of constructing story, is precisely what is lost in processes of participation. When the HQ teams are switching between various sources (internet, CT, media box and overall medieval map) and tasks (answering questions, searching for information, guiding the City team, collecting answers), involvement in the whole story is created. Reversely, for the HQ it remains more abstract about what building, historical saying, viewpoint, character one is talking, and by physically experiencing these narrative elements, they become more meaningful for the City team.

Though storification is enhanced by 'living the narrative', as in the case of participating, it is also central to storification to have narrative overview as in the case of the constructing. This raises the question how the various ways in which storification can take place can be applied into games in such a way that one creates enough *involvement in the whole story*, while at the same time maintaining enough *meaningful experience of the narrative elements*.

In this game this was succesfully combined, by the creation of two different roles, to be played by every pupil. For future research on games and game design it is relevant to explore whether it is possible to further merge these storification processes.

Acknowledgements

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Appendix

Assignment structure of FQ 1550 © Waag Society

Type of Assignment	City Team		Head Quarter Team	Intended narrative organization
Orientation assignment Location 1	Theme	Text about theme	Text/audio/video about theme	Linking area, to actions, events and outcomes to general characters, and sometimes historical figures.
	Part 1	Make a picture of (building X at) the hidden location / the area that used to be....		Awareness of area in terms of environmental structure
		Send to HQ	Collect CT picture in mediabox Choose the correct image that belongs to this area (multiple choice question) TIP: Search on [URL + keywords]	
	Theme	Text about theme	Text/audio/video about theme	Linking area, to actions, events and outcomes to general characters, and sometimes historical figures.

	Part 2	Make a video from the area from the angle X [described in words or shown in picture]. (Image the work X conducted in this area). Send to HQ	Select and drag two images from the medieval map (that illustrate [theme X] in [sector Y]), to the media box Collect CT video in mediabox	CT: Awareness about historical viewpoint and actions, connecting these with buildings and tools, and in one case character. HQ: Learning about the work conducted in area, sometimes linking locations to intentions and actions.
	Part 3	What is the name, meaning or amount of X [building, location, character]? (open text question)	What is the name or meaning or amount of X [building, location, character]? (open text question) TIP: > The City team can find this by... If not, search on [URL + keywords] OR > 'Think of...'	Awareness about the function of locations, of working artefacts, or of buildings, sometimes linking them to actions.
[Uitbeeld] assignment Location 2	Theme	Text about theme	Text about theme	Linking area, to actions, events and outcomes to general characters, and sometimes historical figures.
	Part 1	Make a picture of X [area, building, part of building or location]		Awareness about the locations linking them to the perspective of characters.

		Send to HQ	Collect CT picture in mediabox Choose correct image [drawing or picture of area, building, part of building] (multiple choice question) TIP: Search at [URL]	
		Text about theme	Text/audio/video about theme	Linking area, to actions, events and outcomes to general characters, and sometimes historical figures.
	Part 2	Make video in which you illustrate saying X	Explain the meaning of saying X Open wikipedia/google and search with the terms A and B.	Awareness about the function of area, building, part of building or location.
		Send to HQ	*Collect CT video in mediabox*	
	Part 3	What is the name of X [building, tools] / what is X meant for? (open text question)	What is the name of X [building, tools] / what is X meant for? (open text question)	Awareness of historical actions and events of general characters or historical figures.
[Verdiepings opdracht]	Theme	Text about theme	Text about theme	Linking area, to actions, events and outcomes to general characters, and sometimes historical figures.

Location 3	Part 1	Make a picture of specific X [building, or specific detail] that represents Y [theme related detail]		Awareness about the function of buildings, or working artefacts, in one case linking them to actions.
		Send to HQ	Collect CT picture in mediabox Choose correct image (multiple choice question) TIP: > The City team can find this by /at / on... If not, search on [URL + keywords]	
		Text about theme	Text/audio/video about theme	Linking area, to actions, events and outcomes to general characters, and sometimes historical figures.
	Part 2	Make a picture of specific X [area, building, or specific detail] (that represents Y [theme related detail])	Explain name/ function / reason of X [building, tool, event]? or Identify which pictures/ elements represent X [character, tool, function]? Use internet [wikipedia or google] /CT players / CT pictures as information source.	Linking area to historical symbols or historical figures.

	Send to HQ	*Collect video CT in mediabox*	
Part 3	What is function/ name/ amount of X?	What is function/ name/ amount of X?	Awareness about the function of locations, of working artefacts, and of buildings.
	(open text question)	(open text question)	
		TIP:	
		The City team can find this by...	

Figure Captions

Figure 1. Narrative organization

Figure 2. Media structure in the game © Waag Society

Figure 3: Map of medieval Amsterdam showing routes of City teams © Waag Society