Mission from Mars
- A Method for Exploring User Requirements for Children in a Narrative Space

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ABSTRACT
In this paper a particular design method is propagated as a supplement to existing descriptive approaches to current practice studies especially suitable for gathering requirements for the design of children's technology. The Mission from Mars method was applied during the design of an electronic school bag (eBag). The three-hour collaborative session provides a first-hand insight into children's practice in a fun and intriguing way. The method is proposed as a supplement to existing descriptive design methods for interaction design and children.

KEYWORDS
Design method, Mission from Mars method, eBag, requirements for new technology, shared narrative space, participatory design.

INTRODUCTION
New methods for designing technology for children are constantly emerging, many that encourage children to participate in the design process. In this paper we contribute to these methods by propagating the 'Mission from Mars' workshop as a fruitful method for gathering users requirements among children by establishing a shared narrative among the participants in the design process.

As participatory design methods are becoming increasingly accepted, there is also a growing acceptance of the stance that new technology for children should be developed according to children's existing practices. In spite of the general acknowledgement of user participation, discussions about what roles the children should play during the design process are still sparkling. The roles, ranging from active co-designers [22, 6, 7, 9] to less active informants as advocated in [21] and [20]. These different conceptions of children's role in design have a heavy impact on the way user requirements are gathered during design [8].

Druin [6, 7] has developed a cooperative inquiry framework based on participatory envisioning, contextual inquiry and lab observations to involve children as legitimate co-designers in the design process. During the design process, the children's practice is reflected in their design contributions. The cooperative inquiry framework is indeed a highly useful methodology for gaining access to children's practice, however [16] emphasize the need of time and effort to establish a productive intergenerational design team.

To gain access and insight into the everyday life of children, several methods involving sending out probes to the children have been developed. [19] propagate the use of Photo Diaries as a way to get probes into the process of designing children's technology. This method is further developed by [10] that suggest the use of technology probes as a way to comprehend the needs and desires of users in a real-world setting. [11] experiment with the use of MMS messages to gain access to children's everyday life. In these methods the probes can be seen as static appearance of the designer, and the user and their practice materialized and represented in the probe.

[1] offer the 'KidsReporter' method as a way for children to contribute to a design problem through the making of a newspaper with the children's ideas about a certain topic. [18] provide a similar frame-work in which children's use of mobile technology is investigated and reported during a three-hour workshop in which the children create an internet-based News Portal (www.networkingkids.dk) by means of new mobile technology. Both the KidsReporter and the NetKids.News method provide a framework for gathering user requirements in the geographical and social

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context of the children. Both methods establish inspiring social settings in which children are encouraged to participate and thereby expose their practice and especially their use of technology for designers. These methods are useful, when conducting open-ended research into children's practice. However neither of the methods provide a frame-work for questioning specific user requirements according to elements in children's practices.

In resent design projects some of the authors have experimented with shared narrative spaces in various participatory design contexts e.g. [17, 13, 12]. We define a shared narrative space as a social constructed environment in which conventional cultural expectations are temporarily bypassed. Although these experiments were conducted with adult users, they convinced us, that the potential of a shared narrative environment might be fruitful when designing with children.

Inspired by both the KidsReporter and NetKids.News framework and the resent studies of design games this paper propagates a new method for gathering specific user requirements by establishing a shared narrative space in the children's practice. In the following, the Mission from mars method is presented as a supplement to existing methods for gathering user requirement.

DESIGNING AN ELECTRONIC SCHOOL BAG

The Mission from Mars workshop was carried out within the context of the iSchool project. The iSchool project is a part of the Center for Interactive Spaces, ISIS Katrinebjerg; an interdisciplinary research centre bringing together as diverse disciplines as architecture, engineering, and computer science with the research mission to create new concepts for future interactive spaces. As one of the application domains, the iSchool project focuses on developing software infrastructure, GUIs and spatial concepts for interactive school environments.

Within the context of the iSchool project, a software system focusing upon handling the pupils' electronic school material is under development. The system is called eBag [2, 3], and is each pupils digital counterpart to the physical schoolbag; a personal digital repository where the pupils may store pictures, videos, music, and documents to be used for school projects or free time. The eBag may exist on several platforms (mobile phones, large displays, PC's) and provides pupils with the ability to seamlessly access and share digital material. The mobile phone acts as each pupil's personal key to opening the eBag. When the pupil approaches a display connected to a Bluetooth unit, the personal eBag will appear on the screen.

We acknowledge that the point of departure for designing new artifacts is the current practice of the users. Part of this understanding is rooted in the artifacts that inhabit user context. In our case the school bag was of particular interest since the concept of the eBag to some extent was coined as the digital counterpart to the traditional school bag. As part of the children's school- and everyday activities the traditional school bag has been appropriated to fit the practice of the children. As part of our efforts to design the eBag we wanted to gain an insight into the traditional school bag as a part of the children's practice, and how it had been appropriated into the activities concerning schoolwork as well as their everyday life. An insight into the qualities that make the traditional school bag a successful part of the children's practice would be a pivotal criteria for succeeding in designing its digital counterpart.

Figure 1. The first prototype of the eBag

With the Mission from Mars method, we wanted to gain insight into:

- The everyday life of the future users
- The context of the future system, in this case the school context
- Social relations and behavior among the future users
- The social relations in the context
- The use of the existing systems today, in this case the physical school bag
- The use and extent of personalization and customization of the context
- The use and extent of personalization and customization of personal objects
- The use and extent of personalization and customization of the existing system
- The future users' attitude to order and sorting
- The future users subjective opinion regarding all the things mentioned above

THE MARS WORKSHOP SETUP

The Mission from mars workshop was conducted in the early phases of the eBag development process in an effort to understand the nature and role of the physical school bag as a point of departure for designing the digital counterpart. In the following we describe the Mission from Mars workshop setup and discuss both how the results informed our design as well as issues relating to the method. Table 1 (next page) provides an overview of the method.

Participants: 7 children aged 10-11, 5 members of the design team.

Setting: Two classrooms in a lower secondary school.

Duration: 3 hours total

Equipment: Video camera, monitor, speakers and equipment connecting the three.

Setup: In one classroom a member of the design team is located assuming the role of the Martian. A monitor connected to the video camera is placed in this room. The second room (the broadcast room) is equipped with the video camera.

Primary activities:

1. Establishing the narrative

- A member of the design team introduces the story that will provide the frames for the workshop.
- The broadcast setup is introduced – the children must present their material in front of the camera.

2. Preparing for the encounter with the Martian

- The children are divided into three groups. A member of the design team joins each group.
- The children prepare what they want to present in the broadcast room.

3. Encountering with the Martian

- The groups take turns presenting their material in the broadcast room. The member of the design team located in the other classroom can ask questions to the pupils regarding the material.

Table 1: Overview of the Mission from Mars workshop

We prepared the workshop by contacting the school for permission, and they appointed a teacher who helped us choose suitable children. We did not take any part in selecting the children who should participate, since we did not have any relation to them at all, and did therefore not know their personalities. The teacher did not take any part in the workshop, she left when we arrived.

The workshop took place in a lower secondary school. The participants in the workshop were seven children between the age of ten to eleven. The workshop leaders were four visible male researchers in their thirties and a fifth invisible female "Martian". There was one researcher per group, and one researcher that helped out where it was needed, and who also wrote/gathered documentation.

The children divided themselves into groups so they worked together with their friend/-s. This was important so they would not be shy in front of each other. The four girls were divided into pairs of two best friends working together. We had planned for four boys to participate, but at the end they were only three, so the three boys worked together as one group. This turned out to be an interesting constellation, since we got a first hand insight into how the children behave towards their best friend but also how they behave to a not so close class mate. The two best friends of the three were more dominant than the third boy, who was much quieter.

Finding common ground

Starting out with an informal introduction we tried to level with the pupils and relate ourselves to them in a different way than if we were teachers. This was accomplished by small-talking around subjects that are important to them, namely soccer, fast food and music. In this way they saw to some extent that we were like them and on common ground, which was a good starting point for introducing the narrative.

Establishing the narrative

Secondly we introduced the narrative of the MARS-workshop. The idea was to establish a story in which the pupils should take part to accomplish the mission stated in the narrative. The story was illustrated by a range of computer renderings (see Figure 2) that was projected on a wall during the introduction.

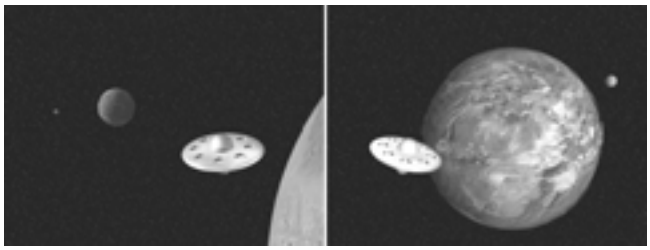

Figure 2. Examples of renderings illustrating the narrative

The start-off was a contact established by Martians to our research center. We received/picked up some signals, and we made our computer scientists call for a translator. We brought the translator to the class room and wanted the pupils to participate in the translation and decoding of the Martian signals. This was done in a very simple, and at the same time convincing, way. We had written all messages as text chunks in our own language and then changed the font type to "symbol". This results in an unintelligible piece of text looking mostly like strange Greek letters. Each chunk was copied to the clipboard of the computer from where we presented the narrative, and pasted it into notepad that was the visual manifestation of our translator. As notepad only works with one text type everything was converted back to normal text with some errors and strange symbols but still possible to read and understand (see Figure 3).

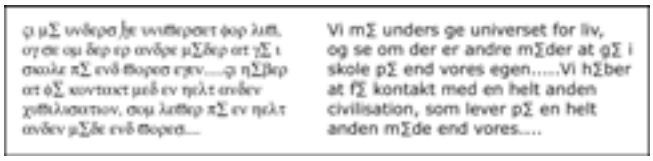

Figure 3. Examples of coded and decoded text chunks

Slowly we went through the signals and had the pupils discuss and translate everything. The story evolved, creating the shared narrative space as we see it, and we all understood that the Martians were interested in the way

schools function on earth and especially how pupils spend their time during the day. Due to problems in the Martian space shuttle they could not break through the atmosphere and therefore communication with them had to be through a video connection to their orbiting space shuttle.

Preparing for the encounter with the Martian

After we had decoded the signals we divided the pupils into the three groups and distributed them in the classroom. Together with a facilitator from our research center each group had to prepare a short presentation of their school day mainly focusing on their school bag. The reason for the preparation was related directly to the story as the transmission connection was possible when the shuttle was above our part of the world. The session had to inform the facilitator in an informal way and on the other hand prepare the pupils not to expect the Martian to understand any of the content of their school bag. Therefore they had to think thoroughly about each object in the bag and consider whether it would be interesting for the Martian and hereby informing the facilitator (see Figure 4).

Figure 4. Preparing for the Martian broadcast

The broadcast setup

In two nearby classrooms we established the transmission setup. In the first room we installed the Martian stand-in who was supposed to communicate with the three groups of experts, namely the pupils. Here we installed a TV monitor, loudspeakers and a microphone. In the second room we installed a DV camera connected to the TV monitor in the first room, loudspeakers and a microphone. In this setup the Martian would have audio and visual feedback whereas the pupils would only have audio feedback from the Martian. To increase the effect of the Martian voice we used a foreign researcher as stand-in, who spoke our language with an accent through a tin can to add a metallic noise (see Figure 5). Due to a real-time audio translator "developed" for this mission the Martian could speak our language.

Figure 5. The Martian tin can microphone and the setup

Encountering with the Martian

In turns the groups went into the broadcast room and sat in front the DV camera that was placed behind a desk where the pupils could lay out and show the prepared things for the Martian. The connection got establish by one of the researchers who tested the microphone and got feedback from this strange Martian voice (see Figure 6). After that the communication was between the Martian and the pupils who explained about the content of their bags and how they used it during the day. The Martian could ask very stupid questions and have the pupils putting different props closer to the camera to give a better look at them. As some of the groups had difficulties to understand some of the responses from the Martian the researchers helped to interpret. After about 10-15 minutes the connection was cut and the next group would enter the room to give their story to the Martian.

Figure 6. Pupils broadcasting and the watching Martian

LANDING THE REQUIREMENTS FOR THE EBAG

When returning to our lab at the end of the day, we sat down and shared experiences and impressions from the workshop. Since we all had different roles and locations during the day, it was important to share this information with each other to be able to create the whole picture and see the scope of the results.

The primary source of data from the workshop was the video obtained from the preparation and broadcast. Several methods have been proposed for applying video data within the context of design [15, 4, 5]. In [14] Iversen discusses how video may be used when designing with children. In order to bring the video data into the design of the digital school bag we used the Interaction Analysis Lab method as described by [15]. This method has the advantage of allowing researchers to gain a general overview of large amounts of video data while maintaining the ability to work with specific sequences in a collaborative setting.

The video data from the preparation as well as the broadcast was initially logged into segments, and subsequently specific segments that were deemed particularly relevant for design were chosen for further analysis in the Interaction Analysis Lab. The goal of the analysis was to understand the traditional school bag as a part of the children's practice and to identify how these could be reflected in the eBag. The results from the analysis ranged from concrete design ideas to issues that needed to be addressed in the ongoing process. The key requirements for the eBag exposed in the Mission from Mars workshop are

summarized in three categories; personalization, structure, and sociality.

Personalization

The issue of personalization was very central to the workshop and has also pervaded the following design of the electronic school bag. All of the pupils participating in the workshop had given their schoolbag their own personal look. Names of their favorite singer or soccer player were written on the bag. Key chains and other tokens were attached to the bag so that they would be visible to others. When presenting the schoolbag to the Martian the pupils were eager to elaborate on the different ornaments and their significance.

Apart from the schoolbag, their pencil cases, calendars etc. were also given a personal stamp of some sort. Perhaps most striking was the personalization and meticulous customization of the pupils' mobile phones. Almost all of the pupils chose the mobile phone as one of the items that they presented to the Martian. Most of the pupils had custom covers, and some even had different forms of tokens attached to the phone. All of them had carefully chosen a sound for their mobile phone that they found neat or cool. They were all very eager to display and talk about their mobile phones and how they used them.

Structure

As the pupils presented their schoolbag and its content to the Martian it became obvious that they had very different ways of structuring the content. Some had a very explicit and precise system for structuring the content of their schoolbag; the calendar was always in one room while the lunchbox and pencil case were stored in a different compartment. Others had little or no system regarding the structure of the content; the different items were more or less randomly found in different compartments. The tendency was for the girls to have the most explicit systems, while the boys seemed to store their items more randomly. The point of these observations is that it is difficult to formulate a meaningful general structure of a schoolbag. Much in line with the issue of personalization the pupils had appropriated the physical structure of the schoolbag in different ways. In relation to our design of the digital schoolbag it made us aware of the problem and potential counter productiveness of imposing a given structure for the content of the schoolbag.

Apart from calendars, lunchboxes, and pencil cases which were found in all the pupils' schoolbags, other more unlikely items appeared during the session. In one example one of the boys found a small rubber figure in at the bottom of his bag. Apparently this had been put in the bag a long time ago and had been forgotten until now. The boy decided to show this figure to the Martian, telling the story about how he had acquired it and what it was used for. This incident led us to discuss another perspective of the schoolbag, namely as a place where some things are allowed to 'sink to the bottom' and be forgotten until they one day are stumbled upon. Having functional support for serendipidous browsing of content in this way, could lead to a pedagogical potential for training combinatory skills. Most of us have probably had similar experiences stumbling over items that we had long forgotten existed; items that bring back memories of past activities or experiences and gives us input to a current situation. To some extent the example of the small rubber figure in the boy's schoolbag is similar; it displays how the schoolbag mediated an experience of serendipity.

Sociality

The final point that we will discuss concerns the sociality of the schoolbag and its content. When the boy found the small rubber figure (the example from the previous section) he was preparing what he wanted to show to the Martian. He was sitting alone with only a member of the design team in his company. When initially finding the rubber figure by himself he did not pay it much attention. However, when the other two group members joined him the small rubber figure became the centre of attention; they quickly created stories about the figure and played with him. Analysing the video material, it was striking how the small rubber figure gained attention as a social artifact from which the pupils constructed stories and played. In relation to the design of the digital schoolbag this led us to considerations about being able to share material and engage in joint activities.

Much in line with this example the pupils' eagerness to personalize their schoolbag and its contents also touches upon the issue of sociality. The artifacts that were personalized by the pupils were all in some way visible to other students. In many cases the personalization took the form of making one's position visible regarding a given subject e.g. writing 'Arsenal' on your schoolbag not only reveals that you are an Arsenal supporter but it also in some sense distinguishes you from another group in the class who supports Manchester United. Both regarding football and other subjects such as musical orientation there seem to be different fractions within which you may position yourself. The issue of positioning oneself and navigating the social structures of the school context has subsequently been a pervasive issue in our design of the digital school bag.

The above sections summarize the most central results from our workshop. The workshop was conducted as an initial exploration, and many of the points form the workshop were elaborated later on in the process. Some of the results fostered very concrete guidelines for the design of the digital schoolbag while others raised issues for further exploration. A preliminary design of the new eBag, based on these findings is presented in figure 7. The new eBag allows the pupils to personalize the visual appearance and structure of their eBag. Moreover it allows the pupils to make files public accessible or share them with groups of pupils.

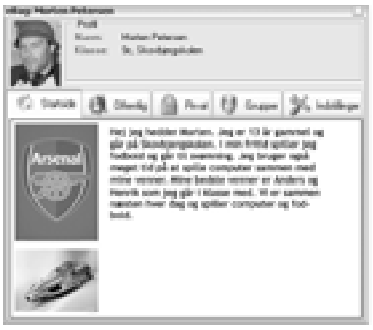

Figure 7. The second prototype of the eBag.

EVALUATION OF THE MARS-METHOD

The age of the workshop participants turned out to be in the borderland for buying the Martian story or not. Most of the children were suspicious of the story and did not believe that they were talking to a real Martian. This turned out to be of no matter, since they discussed their discovery with each other, and then they continued to play along in the set -up. One group, however, was convinced of the fact that they actually talked to a real and true Martian, and they even asked for the Martian's email address.

Leveling the playground

However, establishing this kind of narrative between us as outsiders with regards to children's everyday lives, and the children, gave us a common ground we could meet on. The normal relationships between young and adult in the school were changed and we tried to obtain a role that was as uncommon to us as to the kids – communicating with Martians - which in return made a safe space for the children to expose themselves. Kids of the age we approached are particular anxious about looking childish in front of their peers. It is the age where they are becoming more aware of looking adult or like a teenager. The Martian story and the fact that some of the pupils really didn't believe it, but went along with it anyway, made us look a little ridiculous, but we believe that it helped us level the playground and get better input from the kids.

The Mars-method enabled us to get a look into the kids' life-world, and most importantly it allowed us to, in a play-like atmosphere, define a shared envelope in time and space, within their own context, based on a narrative.

Distributed setup

The spatial distributed workshop setup played an important role for the narrative to work. Like actors moving from set to set and thereby getting new feedback and inspiration to the role they are playing, the groups were moved around from "the introduction and decoding" over "preparation of the presentation" to "the encounter", which increased the credibility of the narrative. As mentioned earlier not all groups were convinced about the genuineness of the story, but because we could refer to other yet unknown spaces where the narrative would proceed later the focus and interest were kept intact. The acting part went for the researchers as well, playing or pretending that they did not know the Martian. We had to help translate some of the questions asked by the Martian and could thereby in a legitimate way interpret it in a direction that could give new information that would seem silly or degrading if asked by an adult or researcher outside this temporary narrative context.

The representation of the Martian

The physical representation of the Martian was the DV cam and the audio feedback (see Figure 8). The fact that s/he was not visually presented resulted in the creation of yet another space, as an imaginative space made by the kids. Because a weird unknown voice responded to the things they presented for the camera, it again helped keeping focus and interest. If we instead had tried dressing the Martian stand-in up as a Martian and established a physical face-to-face interview we would most plausible get the same reaction as when kids who are a bit too old to believe in Santa drag in his long white beard when meeting him, which would take the focus away from the narrative. In this setup the kids were kept as experts of being pupils and focused by the mysterious Martian "eye" with which they were engaged. Because of the rather abstract representation of the Martian, we believe that the kids did not dare or wish to insult him/her because after all the story could be true. The group that was most convinced by the story asked the Martian about his/her world and of course if the general Martian skin color was green.

Figure 8. The camera representing the Martian

It would be an obvious critique of the Mars-method, that a really good teacher or pedagogue would be able to establish the same kind of safe space or confidentiality for a specific interaction with the children, either through a narrative or through other means. However we believe that it is of great importance that the people designing the application afterwards are the ones confronted with the children's stories and experiences. So the Mars-method offers an opportunity to the technical developers and designers to engage with the children, establish the necessary level of confidentiality through role-play, and get to the actual requirement for making a design which is meaningful to its users in the context.

Our experiences indicate, however, that it does not really matter if the test subjects believe in the story or not, because when they get excited over the task they play along. This is the positive thing with a workshop set up

where we as designers meet with the children within the game, and where we cooperate towards a common goal.

The Mars-method proved to have its strength in providing a shared narrative space in which questions according to the everyday life of the kids could be asked and answered in an informal way. This kind of information would be very difficult to retrieve from e.g. probes [19] where the selection of gathered and documented material lies solely on the user, whereas the Mars-method facilitates the discussion between children, which the researchers mediated through the shared narrative which offers the possibility of posing very "stupid" questions.

Comparing the Mars-method to 'KidsReporter' [1] where the kids are contributing to the design by gathering information on different topics playing the role as journalist, our method tends to extract another kind of information. Both methods work on the basis of a shared narrative or role play, but they relate differently to the context of the children. 'KidsReporter' is set in an unfamiliar contextual setting which encourages the kids to explore, whereas the Mars-method is established in the children's own context why it points more towards gathering specific user requirements.

CONCLUSION

This paper propagates a design method 'Mission from Mars' for gathering requirements when designing children's technology. The method is inspired by previous work on design games and shared narrative spaces as well as dedicated methods for designing with children. By applying the 'Mission from Mars' method to the design of the eBag we were able to support the design process in various ways. First, the method provides us with information on how children personalize their stuff and in which manner this personalization is carried out. Second, the individual structures of the children's physical school-bag were spelled out as a foundation for structuring the digital material on the digital eBag. Finally, the Mission from Mars revealed aspects of the creation of social meaning of artifacts. In this way, the method provided a valuable input for the design of the eBag.

As mentioned in the introduction, the Mission from Mars method is treated as a supplement to the existing repertoire of methods for requirements gathering with children. However, when comparing the outcome of the Mission from Mars workshop with other methods, the potential of the method is apparent. The methods main strengths is that it is a playful and motivating framework for both children and designers and the shared narrative space makes it possible to ask questions that would be impossible to raise in a conventional setting. Whether the Mission from Mars method will work as well with other age groups than the children of 10-11 years has not been tested. However, our research experiences with both the Mission from Mars set-up as well as the work with design games indicate that shared narrative spaces are indeed a recommendable setting for the gathering of user requirements.

The methods main strengths is that it is a playful inspiring framework for both children and designers and the narrative shared space makes it possible to ask questions that would be impossible to raise in a conventional setting.

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