QUEST ATLANTIS AS
AN ALTERNATIVE EDUCATIONAL TOOL

– Children’s voices on Quest Atlantis and a method for involving users in participatory design –

Georgiana Danet

Project place: Fifth Dimension site on BTH, Ronneby
Department for Work Science and Media Technique
Department for Computer Science and Hardware Technique
Quest Atlantis as an alternative educational tool – Children’s voices on Quest Atlantis and a method for involving users in participatory design.

**Information**
This thesis has been conducted at the Department of Human Work Science, Media Technology and Humanities at Blekinge Institute of Technology in spring 2004 as the final exam for my master in Human Work Science and Computer Science.

**Contact Information**

Author:
Georgiana Danet
Kyrkogatan 2B, 3 Tr.
371 32 Karlskrona
E-mail: georgiana_d@hotmail.com

Supervisors:
Berthel Sutter
Department of Human Work Science, Media Technology and Humanities
SE-372 25 Ronneby
E-mail: bsu@bth.se
Internet: www.bth.se/iam

Björn Stille
Department of Computer Science and Hardware Technique
SE-372 25 Ronenby
E-mail: bst@bth.se
Internet: www.bth.se/ipd
Abstract

Alternative educational tools have been investigated, in form of a meta-game structure, a computer-based educational software (Quest Atlantis) which was used in an after-school environment within the frame of Fifth Dimension site in Ronneby. The study is based on field material from five sessions, each of two hours. A first focus in this thesis is on the extent to which such a virtual environment can be used for educational purposes, to which extent it can supplement the traditional educational system. A second focus is on how appropriate the software is to its educational purpose and how it can be improved by means of participatory design. The analysis of the data shows that computer games are a rich setting for human learning, in a more dynamic, active and involving manner than traditional education. In this particular case, we came to the conclusion how the software has to be improved in order to suite children’s computer skills and we came up with an original method for involving users in participatory design.

Keywords:
Alternative educational tools, participatory design, learning science, human cognition.
Acknowledgements

I would like to thank my supervisors, Berthel Sutter and Björn Stille for their valuable comments, feedback and support throughout the project.

I would also like to thank Tiina Martinson and Charlotte Colin who helped me assist the children during the entire project.

I thank the children involved in the project, they were my source of inspiration for the participatory design method I elaborated.
A brief introduction to the project and its goals, followed by sections on the methods used, a comparison of traditional and alternative educational systems, a description of the project settings, and suggestions for product improvement. The document concludes with a discussion and references, including literature on participatory design and technical annexes.
1. INTRODUCTION

During the spring term 2004 I conducted an experimental project in which there were involved five 6th graders. The project took place on a Fifth Dimension\(^1\) site at Blekinge Technological Institute, Ronneby. It consisted of children exploring and playing Quest Atlantis (QA), a three dimensional world educational game, containing a central space, called OTAK Hub, from which one can “teleport\(^2\)” to 7 different worlds: Culture, Health, Unity, Ecology, Peace, Story Inn and Oceanic. The story behind the game is that the people of Atlantis face an impending disaster: despite their technological development, their world is slowly being destroyed. In an effort to save their civilisation, the Council developed the OTAK – a virtual environment that serves as a technological portal between Atlantis and other worlds. The OTAK features two components: a personalised online portfolio and a virtual 3D space. The 3D space contains the different worlds created by the Council and each world features several villages that present a series of challenges called Quests, which are designed to help restore the Atlantian knowledge. Through the OTAK, people from other planets can help the Council by engaging in Quests and sharing their experience and wisdom. In the QA manual it is also specified that today’s youth, with their adventurous optimism and enthusiasm, can contribute the sort of knowledge that the Council seeks. Every quest values between 1 and 10+ points, points that represent the difficulty levels of quests.

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\(^1\) The Fifth Dimension is an after school program that engages learners in educationally meaningful play by using computer programs and games as alternative educational tools, held together by an over-arching make-believe activity system, and which transform the way individual games are experienced by the children.

\(^2\) teleport = In QA there are 7 functioning worlds. You can go directly from one world to another by “teleporting” yourself. You either write the co-ordinates you want to go to, and then press “teleport”, or you simply double-click on the name of the world you desire to go to.
My interest in this project has two aspects: firstly, to study how one can capture children’s voice in such a way that one can improve the educational tool, and secondly to which extent such a virtual environment can be used for educational purposes and how appropriate the software is to this goal.

My first focus is also very much centred upon how one can involve the users of such educational tools in participatory design. “Participatory design (PD) represents a new approach towards computer systems design in which the people destined to use the system play a critical role in designing it.” (Schuler & Namioka, 1993)

I refer to the game as “alternative educational tool”. The settings of a project in which such a tool is used is different from the traditional system, in which the learning process is mediated by different manuals and different teachers for different subject matters. This project can represent a minor-scaled alternative educational system. Such a system presents, in my opinion, several differences compared to the traditional educational system. The major differences are summarised in Figure 1:

<table>
<thead>
<tr>
<th>Alternative educational system</th>
<th>Traditional educational system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children are actively involved in the learning activity, they choose what they want to answer to, work with.</td>
<td>Children have a passive attitude in a classroom, there the teacher stands in front and talks, and the children sit in the benches and listen to him/her.</td>
</tr>
<tr>
<td>Children deal with more than one topic during one session.</td>
<td>Children deal with one topic during one lesson.</td>
</tr>
<tr>
<td>Teachers’ involvement is minimised.</td>
<td>Teachers’ involvement is extensive.</td>
</tr>
<tr>
<td>Children are agents of situation changes.</td>
<td>Teachers decide what is to be done in the classroom.</td>
</tr>
<tr>
<td>Children deal with a multitude of tasks simultaneously.</td>
<td>Children deal with one task at a time.</td>
</tr>
</tbody>
</table>
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| Learning occurs in a rich, fun, entertaining, omnidirectional context. | Learning occurs in a monotonous, unidirectional context. |

Fig. 1 – Some differences between the “alternative” and the “traditional” educational system.

1.1 Project outlines

The project was conducted as an after-school activity for 5 weeks. We sent a description of the project to several schools and an application form for children’s parents to fill in. The 6th graders came to the university’s Fifth Dimension site once a week, for two hours. Of these two hours, for 75 minutes they were playing QA, then they had a cookie break for 15 minutes, and the last half an hour they were allowed to play other games on Internet. The time table of the project is presented in Figure 2.

<table>
<thead>
<tr>
<th>1st week</th>
<th>2nd week</th>
<th>3rd week</th>
<th>4th week</th>
<th>5th week</th>
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<tr>
<td>2 hours</td>
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<td>75 min</td>
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<td>15 min</td>
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<tr>
<td>2 children played Quest Atlantis</td>
<td>4 children played Quest Atlantis</td>
<td>4 children played Quest Atlantis</td>
<td>4 children played Quest Atlantis</td>
<td>5 children played Quest Atlantis</td>
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<tr>
<td>cookie break</td>
<td>played Internet</td>
<td>cookie break</td>
<td>played Internet</td>
<td>cookie break</td>
</tr>
</tbody>
</table>

Fig. 2 – Project time table.

Each week they had an assignment for QA. The first week, it took a lot of time to create the accounts for each participant, because the Internet connection was not functioning well. Then, for the rest of the time the children needed to get accommodated to the game, so there were no assignments during this first week.

The next two weeks they had to answers quests in order to gather at least 5 points, and they could choose quests from one world or from several.
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The last two weeks they had to complete four tasks from four different worlds, one quest from each world, irrespective of the amount of accumulated points.

<table>
<thead>
<tr>
<th>1st week</th>
<th>2nd week</th>
<th>3rd week</th>
<th>4th week</th>
<th>5th week</th>
</tr>
</thead>
<tbody>
<tr>
<td>assignments</td>
<td>The questers had to answer to whatever quests they choose in order to gather five points.</td>
<td>The questers had to answer to whatever quests they choose in order to gather five points.</td>
<td>The questers had to answer to four quests from four different worlds, one quest/world.</td>
<td>The questers had to answer to four quests from four different worlds, one quest/world.</td>
</tr>
</tbody>
</table>

Fig. 3 – The assignments children received during the project.

1.2 Quest Atlantis – a short description

Quest Atlantis is a technology-rich educational innovation in form of a 3D virtual world game, for children between 8-12 years old. It started in the beginning of year 2000, when Sasha Barab\(^3\) and Kurt Squire\(^4\) thought of bringing a meta-game structure, based on the work in the video-game industry, into a computer-based educational software in an after-school environment. It is an online role-playing adventure game that aims to motivate the kids to learn academic content, but also to engage in activities away from the computer and to see evidence of growth in their lives away from the after-school activity. It would positively influence the lives of children in a holistic manner.

The Quest Atlantis project is led by the Center for Research on Learning and Technology (CRLT) at Indiana University, Bloomington.

The QA team constantly runs updates on the software.

\(^3\) Sasha Barab is associate professor in Instructional System Technology and Cognitive Science at Indiana University. (http://inkido.indiana.edu/barab)

\(^4\) Kurt Squire is PhD candidate in the Instructional System Technology program (IST) (School of education).
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Quest Atlantis is used in 10 schools in Australia, 3 schools in Singapore, 5 schools in United States, and 2 after-schools contexts. It was purposefully designed to cultivate the development of several dimensions (culture, health, social commitment, ecology, peace, story inn) within and among the children who participate, through quests meant for individual commitments and through functionality of the program’s technical infrastructure, for example enhancing in the users a sense of responsibility to other members of the Quest Atlantis community. The commitments appear also in form of animated movies and plotlines through which Council members share their stories and communicate with the children. The quests, though connected to academic standards, are rooted in the designers’ social commitment and framed by the types of issues and interests that the children themselves have expressed, during the participatory design process that took place in the United States.

For example, as children complete quests, they can work to understand their own lives in terms of the extracurricular activities they view as interesting (movies, music, magazines); more importantly, they can bring stories from their own family and culture (when children from different countries are involved) as material for meaningful reflection.

The wide variety of ways in which Quest Atlantis invites children to express their experiences may also be regarded as an aspect of the thematic content in the design of the game. For example, within the virtual space, questers may freely choose their activities: exploring the Quest Atlantis space, answering quests, text chatting with friends and building in the space. The individual homepages for children speaks to the children’s need to experience a sense of ownership. They also allows for the children to express the continuos changing of their sense of self-identity.

The information is from year 2001. The number of countries and sites using Quest Atlantis increased meanwhile.
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The flexibility in the design includes several characteristics, which are opposed to the traditional educational system: self-determination (as opposed to coercion), intentionality (as opposed to reaction), creativity (as opposed to homogeneity) and rationality (as opposed to chance) (Barab, Thomas, et al.).

1.2.1 Quest Atlantis – How it works

In order to start playing Quest Atlantis, one has to download the software from Quest Atlantis homepage.6 It requires 5 MB on the hard disk (see Annex 2 for more technical information). After installing one has to follow the instructions in the “Quest Atlantis Manual for Teachers and Facilitators” in order to register the questers. I did the registration for all the children, they choosing, of course, their username and password. After the registration was admitted, children could log in on Quest Atlantis, by typing in their username and password. They will automatically enter the 3D world, being placed in OTAK hub.

![Fig. 4 – Quest Atlantis Interface, OTAK hub 3D world](image)

6 http://www.questatlantis.org
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The structure of QA is made in such a way so OTAK hub serves as a link between Atlantis and other civilisations. From here one can teleport himself/herself to the other seven worlds.

**Structure of Quest Atlantis**

Atlantians have set up a portal, known as the OTAK, to gather knowledge from other civilizations to help stop the destruction of their planet. The OTAK is the virtual environment through which users can share their knowledge with Atlantians.

![Structure of Quest Atlantis](image)

**ON EARTH**

Children give knowledge to the Atlantians by completing Quests about how their environment and civilizations function.

**OTAK**

The OTAK is the communication line between Earth and Atlantis.

**ON ATLANTIS**

Council Members communicate with civilizations through the OTAK to gain wisdom to resolve Atlantan problems.

NOTE: Teachers and mentors pose as anonymous Council Members to respond to students.

**Fig. 5 – The structure of Quest Atlantis**

While they wonder through the virtual worlds, they encounter the rotating circles/quests. There are almost 500 different quests in QA that are divided into the seven worlds. The quests’ topic depends on the world the quester is in. One can read and listen to the quests, which set up an assignment to be solved. It explains the goals of the quest, gives suggestions of what resources one can use. The range of resources depends on the quest. The quests that value 1 point are the easiest, they take the less amount of time and usually they do not have proposals for resources. The resources can be anything from searching the Internet, analysing newspapers or articles, interviewing people, researching other cultures, doing small experiments, environmental studies, etc.

Every quest is worth between 1 point and 10+ points. They all have different colours, indicating the amount of points. The level of difficulty is
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based on the amount of time the developer of the quest expects a child to spend solving it.

One can choose a quest by double-clicking on the rotating symbol for the quest. By doing this, a side-bar window opens, with the content of the quest (see Annex 1).

If the child likes the content, s/he will start the quest by clicking on “Start the Quest!” button. S/he will answer it and submit it, by clicking on the “Submit” button. The QA have the option of saving the quest and submitting it later, but none of the children I studied used this function.

Fig. 6– A quest with the answer written in the text field. To some of the quest one can insert attached documents or pictures.
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All these phases, from teleporting to a world, wondering through it and choosing quests are repeated for the entire duration of one session. Other possibilities are to change the appearance of the avatar (the 3D persona representing the quester), chat with other questers or send mail to them.

2. QUESTIONS

As I mentioned earlier, the focus in this thesis is on firstly, to study how one can capture children’s voice in such a way that one can improve the educational tool, and secondly to which extent such a virtual environment can be used for educational purposes and how appropriate the software is to the first aspect.

My first focus aspect is much centred upon how one can involve the beneficiaries of such educational tools in participatory design. Secondly, of interest to me is how appropriate the software is to its educational purpose. Is Quest Atlantis’ design easy to understand for the children? Can it be simplified, without diminishing the content, so that its beneficiary can easily use it?

3. METHODS

During the entire period of the project I videotaped children’s activity for the 75 minutes they were playing Quest Atlantis. There was one video camera in the room, placed in the middle of the workspace (see Fig.7). The camera was recording for the entire period of time, and from time to time I would direct it to one of the two groups of boys, sometimes because one group was more active (in my perception), or because they were involved in an interesting assignment in QA. The children were sitting every week at the same computer. After those five weeks I have transcribed the video material in order to catch “the voice” of the children. The video recording is of crucial
importance when several participants are involved. I could not have been able to take notes during the project and to cover most parts that happened. Not even the video recordings covered “everything”, but they are definitely more extensive in terms of content than written notes.

The ethnographic study was used for the analytical processing of the material. I used the transcripts for structuring the information, for extracting the children’s questions that I used as a requirement specification based on their active involvement in the game (see 6.1.2 Redesign solutions) and for illustrating the ongoing events with quotes from the logbooks. The children’s questions, selected from the videotaped ethnographic material, are the main constitutive part of the participatory design method I developed.

I studied as well several articles that helped me have a larger view upon the learning science and educational psychology. I made use of my knowledge and experience of participatory design I accumulated during my education in the MDA program. My interpretative work then developed as a hermeneutic dialectic in which the data contained in the video recordings and the theoretical knowledge continually reshaped each other. The theory part was used for building a ground on which I make my arguments, but also as help for a clearer perspective on the human cognition aspects.

4. LEARNING SCIENCE: TRADITIONAL VS. ALTERNATIVE EDUCATIONAL SYSTEM

During the four years education on MDA program (Human, computer, work science) we discussed numerous times about human cognition, ability of learning, alternative ways to teaching and learning, the support of the group in learning easier and combining the participants’ skills, and participatory design as a way to improve a product by involving the users in the design process. There are no straight-cut answers to these
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Problematised aspects, but there are many good ideas about how to change a traditional educational system. The foundation for a change agency should be, in my opinion, the understanding in some degrees of: human cognition, human abilities and socio-cultural communities.

There are a number of theories about human cognition that attempt to describe how the human mind is working, how knowledge is acquired. In accordance to these theories, the educational system is built in an effort to offer the most suitable approach to teaching and learning. For example, the cognitive theory treated learning and knowing as processes confined inside the individual minds, separated from the learning context. Teachers are subdued to this failing logic too: traditional educational theories placed knowledge in the head of the learner, which led to creation of educational systems that focused on transmitting their content into individual minds.

On the other hand, situated and distributed cognition present another perspective upon knowledge (or as Barab refers to: “knowing about”), that is no longer conceived of as a static structure residing in the individual’s head; instead, knowing is a process distributed across the knower, the environment in which knowing occurs, and the activity in which learning is a part. “Knowing about refers to an activity, not a thing; knowing about is always contextualized – not abstract; knowing about is reciprocally constructed within the individual-environment interaction – not objectively defined or subjectively created; and knowing about is a functional stance on the interaction – not a ‘truth’.” (Barab and Duffy, 2000, p.28).

Human cognition still preserves some of its mysteries in front of the scientists. There are still processes and mechanisms that scientists did not succeed in deciphering. According to (Salomon, 1993), human cognition is distributed among individuals, knowledge is socially constructed through collaborative efforts to achieve shared objectives in cultural surroundings, and information is processed between individuals and the tools and artifacts provided by culture.
Accordingly, the ability to acquire knowledge or the ability of learning must submit to the same rules. This means that learning is always situated and progressively developed through situated activity. But learning implies more than acquiring a set of self-contained information. It actually involves building a contextualized appreciation of this information as tools, as well as for the situations through which these tools have value.

Learning is more than simply receiving factual knowledge; learning is a process which implies becoming a different person when taking into account the possibilities for interacting with other people and the environment (Barab & Plucker – 2002).

For a long time now, learning taking place in the context of schools sustains knowledge that is rather inert and does not succeed in engaging talented interactions outside of the schools perimeter. Educational psychologists state that we know much more about human learning and achievement than we did only a generation earlier, yet educators still use instructional methods that are based on conceptions of learning ability and talent that are decades old (Bransford, Brown & Cocking, 2000).

Is it then possible to apply the new knowledge about human learning and to reshape the teaching strategies? Is, for example, the Fifth Dimension perspective a possible solution to the obvious problem that traditional educational system encounters? Can participatory design work as a tool of improvement in this respect?

In school learning there is a known tension between learning the material to receive a grade and learning material because of its importance in addressing real-world problems. It is a well-known problem; there are even from time to time television programs or newspaper articles about the stress pupils experience in school because of this tension. Consequently, the learning ability suffers as a result of the stress and pressure pupils have to cope with; and this makes even pupils that are intelligent and talented to display low performance. The traditional school
I believe that the role of context in authentic learning is determinant. By “context” is meant “the physical and social resources and structures, as well as the associated rituals and everyday practices that are engendered. In this way, context is not some stable structure that exists out there, but is instead a dynamic and constantly evolving field of transaction through which members come to locate and produce particular meanings – meaning that are situated and influenced by the particular context(s) through which they are being produced” (Barab, Thomas et al, p.1).

Any traditional classroom context, even without modifications from a design researcher, is impacted by the systemic constrains in which exists. Contexts are never without agency; there are teachers, administrators, students and community members involved, therefore local adaptability must be taken into account in the theory (Barab & Squire, 2004).

If the classroom context is already constrained, and therefore the rules cannot be changed without changing almost the whole structure, an alternative for testing different ways of “teaching” and “learning” are the after-schools projects. Quality after-school programs can provide engaging environments that inspire learning outside the regular school schedule. Children need learning in their after-school hours that engage them in emotionally and intellectually tasks, within a varied range of educational disciplines.

Currently, numerous educators are pleading for a more away from “teacher-centered” instruction models and toward more “learner-centered” and “community-based” models. We know few criteria for distinguishing between a community of learners and a group of students. This is very clear for virtual communities where designers are making use of usability strategies to develop innovative designs, but have not regarded extensively issues of sociability: how the design makes links to and support people’s social interactions, taking into consideration aspects as trust, collaboration, value, time, and gatekeeping (Barab & Plucker,
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2004). And by “virtual” it is understood an extension in space and time from what we directly experience with our senses. But what do we understand by community?

Sharon Traweek (1988) defined a community as a “group of people who have a shared past, hope to have a shared future, have some means of acquiring new members, and have some means of recognizing and maintaining differences between themselves and other communities.”

An online community is “a persistent, sustained socio-technical network of individuals who share and develop on overlapping knowledge base, set of beliefs, values, history and experiences focused on a common practice and/or mutual enterprise” (Barab, MaKinster and Scheckler, p.23).

Lave and Wenger (1991, p.98) define the community of practice as: “Community does not imply necessarily co-presence, a well-defined identifiable group, or socially visible boundaries. It does imply participation in an activity system about which participants share understanding concerning what they are doing and what that means in their lives and for their lives and for their communities”.

The traditional educational system is no longer adapted, in my opinion, to the technological development explosion and to the society’s nowadays rhythm. That is why alternative ways to traditional education are the subject of interest for many researchers, the Fifth Dimension organization being only one example. The traditional school system imprints its lack of flexibility on authentic learning. The alternative educational system gives room for local adaptability, which in its turn leads to flexibility. It also gives learning opportunities that engage children in tasks that are emotionally and intellectually engaging, within a variety of disciplines. In this way the educators in this system take care also of children’s moral and ethic development, not only of their intellectual education. Because, as I mentioned earlier, learning is also about who you become as a person.
5. DESCRIPTION OF THE PROJECT SETTINGS

There were two distinctive groups of children, one group of two friends who were not very engaged in the project, being more interested in other computer games, and the second group consisted of three boys from two different schools. Two of them were in a previous project with Quest Atlantis, so they were already familiar with the game. They all three were taking the assignments seriously, spending the entire time, and some times even during the break, to complete the tasks.

They were placed in the Firth Dimension room like following:

![Fig. 7 – The Fifth Dimension room. The rectangulars represent the computers and the circles are the children and myself. Group 1 is colour-marked with turquoise, group 2 with lavender.](image)

One problem that they encountered from the beginning was the English language. The five children are not fluent English speakers, therefore I and a Fifth Dimension assistant had to help them with the translation of the quests. Children at this age tend to be impatient, therefore sometimes, when all of them needed help with the translation simultaneously and had to wait, they repeated our names several times, some of them raised their arms in the air waving in order to catch our
attention, or simply quitted answering that particular quest. None of them tried to translate the quest by themselves.

Another obstacle for the children in QA was the extent and complexity of the quests’ texts and their academic language. The quests are not adapted (in my opinion) to the level of linguistic knowledge of an 8 to 12 years old child. I have chatted with a teacher from United States on QA about QA, who told me that she and her class (7th graders) have been playing Quest Atlantis for a year, and still did not figure out the whole structure of the game (please keep in mind that their mother tongue is English). The texts for the quests are long, elaborated, with rather difficult terms (see Annex 1). Because the quests were too long, sometimes even if we translated to the children the content, when we reached the end of the quest’s text, they forgot what it was about in the beginning of it. That is why we shortened the content of the quest to the minimum necessary information. After doing like this, I noticed that the children had better “control” upon the quests, and they did not loose their patience either.

Pontus: Can you help me? (with the translation of a quest)
Georgiana: You two can do the quest together...
Richard: Do we get points...?
Georgiana: Yes. Click on it, click on “open quest”.
Richard and Pontus listen to the same quest. They have to choose an animal, do a little research on linked web sites and find five features that help the animal survive in its habitat.
Georgiana: You can talk to each other, help each other with this quest, and you will receive each and one two points for it.
Georgiana (to Pontus): Click on “start”. (I translate to both of them the text of the quest).
Richard: So I have to choose five animals...
Georgiana: No, you have to choose one animal, and describe five features that help the animal survive where it lives.
Richard: Like what?
Georgiana: *For example the chameleon eats insects, changes its colour when facing danger so it can “disappear”...*

Pontus: *How do you find the features?*

Georgiana: *You open the links that are in the quest, and read there what you need.*

Richard: *Do I have to answer in English or in Swedish?*

Georgiana: *You can answer in Swedish.*

The children are involved in several worlds simultaneously, the real world from which they are receiving the instructions, and the virtual world, in which they have to amplify the instructions. They have to do rather advanced tasks, like for example to create their own website. Amongst other things they have to write in the website is a personal e-mail address. Two of them did not have one, therefore they created one ad-hoc. These two boys hovered between QA website window and Yahoo window, and after creating the address they introduced it in the website. Another example of complexity they had to deal with is the quests that have linked website where they could access information about the theme of the quest. Sometimes the children had several windows opened simultaneously, and they had to keep track of what they were doing. This complexity, seen from outside, seemed like the children are having a short concentration span, when in fact they were coping with a multitude of tasks. Figure 8 is an attempt to illustrate this multitasking.
I have tried to interfere with the unfolding of the sessions as little as possible, because my main objective was to see how well such an educational tool can work. The only imposing I did that is similar to traditional schooling was the assignments. The following table (Figure 9) shows the amount of quests they had to complete, as a “school assignment”.

<table>
<thead>
<tr>
<th></th>
<th>Richard</th>
<th>Pontus</th>
<th>Gabriel</th>
<th>Viktor</th>
<th>Linnus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st week</td>
<td>1</td>
<td>2</td>
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<td>2nd week</td>
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<td>3rd week</td>
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<td>5th week</td>
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<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

**Fig. 9** – The number of quests each child submitted each session.

### 5.1 The “neophyte” group

In the beginning, those two boys that never had played QA were interested in the game, but after a while, when they discovered how
difficult it is to understand what to do in the virtual world, and which are
the rules/functions, they lost their enthusiasm for the game and began to
approach the assignments almost as any other regular school assignment
(with a certain amount of reluctance). They had some fun with the game,
especially because they could change the looks of their avatar (their
virtual persona). They also liked the fact that they could see the avatars
of other children logged on QA and could chat with them.

Pontus: Richard, is it you? I can see you (he giggles).
Pontus: Richard, look, I see someone. How fun!
Richard: I jump! Polle, should we jump together? Check it out.
This is fun!
Pontus: Richard, look, I fly! (he laughs delighted).

A function in the virtual world was that they could make the avatar jump,
turn around or act as being happy. The boys enjoyed making their avatar
move in those ways.

When the children discover they could teleport the avatar to different
locations using co-ordinates (i.e. 18 N 23 W), they enjoyed doing this for
a while, but afterwards the function became obsolete to them.

Gabriel: Viktor, I found the place. It is 18 W 9 N. (Viktor writes
in the co-ordinates and teleport himself there. He can see now Gabriel).
Georgiana: Where are you supposed to go now?
Viktor: To OTAK library (and points to the map on the screen).
Gabriel: I am outside the city walls, Viktor. I am on 0 N 12 E.
Viktor: What did you say?
Gabriel: 0 N 12 E. Do you hear the music now?
Viktor: Yes (he is thrilled and smiles).
Pontus: ...aaaaaahhh, it doesn’t even download! (he teleported
himself to a location and the computer is slow).
Pontus: Can you help me? (he addresses to Viktor)
Richard: We do the same quest. (he addresses to Viktor)
Viktor: The co-ordinates are 9 N 11 E.
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Gabriel: Viktor, teleport yourself there, so you can see me.
Richard: I think I got nowhere. Should it be something here?
Georgiana: In every world there are several villages...
Richard: Should I just go around like this?
Georgiana: Look around a bit. If you do not find anything, double-click directly on the name of the world you want to go to, for example “Ecology”...

When completing the quests, these two boys had the tendency to “cheat”, meaning “copy and paste” the answers. For example, one of the quests from the Culture World asked the children to tell why William Shakespeare is of importance to Earth inhabitants, how he influenced our cultural world and why he is famous. In the quest window there are links to web sites about Shakespeare, for children. The two boys copied and pasted the information without reading too much of it. When I discovered that they did like this, I told them that they would not receive the whole amount of points the quest has, because they did not exert their utmost.

Richard: Now I have written a lot of text, do you hear... I want extra points for this, now.
Georgiana: But you have copied it from the Internet.
Richard: Hello! But I can do that, can’t I?

When they thought I could not see them, they were surfing the Internet for other games, or funny pictures, therefore I had to play the role of the “disciplinary policewoman” in order to keep them focused on Quest Atlantis. We gave them an assignment (similar to what happen in school), but they adapted it, modified it, they change the situation, In this respect the children are functioning as agents of situational design. They never behaved in the way one could have expected: read a quest, do the research, answer to it, and send it to QA Council.

They were complaining about the assignments, that there are too many points they have to make, or that there are too many worlds they have to explore.
Another impediment for their enthusiasm was that the computers were downloading too slow all the objects of a new world when teleporting themselves there.

Pontus: *The computer does not work. I get so angryyyyyy!*

Pontus: *...aaaaaahhh, it doesn’t even download! (he teleported himself to a new location and the computer is slow).*

Sometimes the one who had a small computer experience pressed the wrong key and all his work was deleted. This was a moment of great frustration to him, and he pressed several times wrongly.

Oh, no, I get so angry...I was about to save a picture and I pressed the wrong key...nooooo.

The one with better computer skills was helping his friend often in different tasks. There was also a kind of "friendly rivalry" between them: they were trying to raise more points in QA. The roles in their friendship were well defined. The one with more computer experience was the leader, he liked to show off; he acted as the intelligent, skilful, self-confident one. The other, the follower, was insecure when about manoeuvring the computer, his command of English language was pourer, and he imitated almost everything his friend did. For example if they were both doing the same quest, when the “leader” searched for pictures in the Internet, even though this was not a demand in the quest, the “follower” did the same thing.

They were playing almost all the time, pushing, punching, teasing each other, and stealing each other food. This gave the impression that they are unfocused on the task they were supposed to do, but in fact they were focused on the computer, even if they were surfing other websites. They location in the Fifth Dimension room was facing a glass wall. People passed by all the time, but these two boys were focused on their computers most of the time.

Sometimes, when they realised that they are filmed, they tried to avoid the camera, or they installed themselves in the role of the “director”, trying to change the angle of the camera and the filmed “object”.
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A short description of every session of group 1, according to the transcripts from the video recordings, is presented in Figure 10:

<table>
<thead>
<tr>
<th>Week</th>
<th>Group 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>They came 10 minutes earlier, but we started right away. We registered them, explained shortly how to play QA. They fill in the information in the QA individual homepage. We help them creating mail addresses, required in the homepage. Richard chats shortly with another quester. Both choose the same quest, we translate it and they complete it. Pontus chats with me, though he does not know it is I. I show them how to teleport in the virtual worlds. They choose another quest, each his. They answer it. In between working with quests, they send mails from the newly created address, or surf on the Internet.</td>
</tr>
<tr>
<td>2</td>
<td>They come in the room, I tell them the assignment for the session. The first thing they do is to check how many points they have, and compare the results. They can see each other in the QA, this enjoys them. They choose, at my suggestion, to answer to the same quest. We translate it. We need to repeat it several times and help them by showing how to use the links in the ‘Resource’ section of the quest. They send mails, Richard is helping Pontus with it. Richard tests the teleport function. Then he helps again Pontus with the mail site. The other group (group 2) arrives, so group 1 stops working at the computer and looks at what group 2 is doing. They go back to the computers and wonder through different worlds. Richard opens a quest, both listen to it. They quit it and choose another quest, both the same quest. I translate, they begin to work with it. Richard starts looking for picture of animals on Internet, though in the quest this is not a requirement, then Pontus does the same thing. Richard starts playing something else. Pontus continues with the quest. Then Richard sees the world one from group 2 is in, and asks for co-ordinates. He teleports himself there and tries to see the other’s avatar. He chooses a quest in this new world and asks for translation. Pontus chooses the same quest as Richard. When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk. After the break, they play games on Internet, in pairs.</td>
</tr>
<tr>
<td>3</td>
<td>They start directly with a new quest. I translate for Pontus, but he chooses another one because this was 8 points (it will take too long time to complete). I tell them the assignment for the session. Richard is looking at the computer screen of a boy from group 2, and asks him in which world he is. He goes back. Now he and Pontus are in the same world, chasing each other. Then Richard is changing his avatar’s features. Pontus is looking at the computer screen of a boy from group 2, then goes back. Richard and Pontus try to explore the QA toghether, though they are not sure if they are in the same world. Finally, they teleport to the same world, and decide which quest to answer. I translate for them. They both look for picture on the Internet, though it is not a requirement in the quest. They ask me which pop stars to choose for the quest. I suggest some names. They now try to find on internet information about the chosen pop stars and talk to each other about it. Richard copies and pastes a whole page from Internet. I tell him to select the information. He ignores the advice. The two boys have a lot of fun with the artists they have chosen. Pontus is asked for an interview by group 2. Richard is curious and goes over to them. when the interview is ready, they go back to the computers and wonder through QA. When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk. After the break, they play games on Internet, in pairs.</td>
</tr>
<tr>
<td>4</td>
<td>Richard and Pontus are searching for a quest that group 2 already answered to in the previous project. Group 2 is helping them find the location and co-ordinates. Meanwhile, they wonder around in the virtual world. Group 2 found</td>
</tr>
</tbody>
</table>
the co-ordinates and tells that to group 1. Pontus opens a quest. I translate for him. Richard opens a quest, and then he wonders around. Pontus opens another quest. I translate for him. They are talking about something else, pushing and slapping each other. Richard is chatting with me, though he does not know it is I. Pontus joins Richard and reads in the chat frame. They are playing with each other constantly. They open another quest, the Fifth Dimension assistant helps them with the translation. They continue to tease each other. I ask them if they are ready with the four quests they are supposed to do. Richard comments, because he is not ready.

When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk to each other.

After the break, they play games on Internet, in pairs.

They are late. They log in on QA. Richard starts to talk to the Fifth Dimension assistant about the girl he likes. I tell them the assignment for the session. They chose a quest, the Fifth Dimension assistant helps them with the translation. They look at picture on Internet, play with each other, and then go back to answering the quest. Richard talks again with the Fifth Dimension assistant about his girlfriend. He goes back to his computer, starts a new quest. I translate it for him. Pontus choose a quest, and I help him with the translation. […]

When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk to each other.

After the break, they play games on Internet, in pairs.

Fig. 10 – A brief description of all sessions of group 1.

5.2 The “experienced” group

The other group, of three (the third boy joined the project in the last week), was more focused on the assignments. For example, one of the boys did not have time to finish a quest, so he continued with it next week when he came back. They were reading the information on those linked web sites and selecting what they thought was relevant for the quest, even if they later copied phrases from those pages. Two of them, friends from the same school, choose at some point to complete a quest where they were supposed to take an interview of at least four people. They did it, and it took them two weeks to finish it.

Viktor: *I see the question, do you see me?*

Gabriel: Yes, *"Making a difference".*

*(I translate the quest to them: they have to take an interview to at least four persons and ask them questions about differences between for example being a Swede or a Romanian,*
and then they have to come up with an idea on how they can
help people feeling better with themselves).
Gabriel: ...but we are four here, with you four.
Georgiana: Yes.
Gabriel: What should we ask?
(I repeat what I have translated for them. Viktor and Gabriel
start by interviewing me. When they finished it, they ask
Pontus for an interview.)
Pontus: Me? Me? (he points to his chest a bit confused.)
Viktor and Gabriel interview Pontus. Richard becomes curious
and goes to them.
[...]
Gabriel continues with his quest from last week. He interviews
Tiina about differences between being a girl and a boy.

If they were working with a quest and I told all of them that now is cookie
break, sometimes they sat put until they finished it. The two boys who
have already been involved in a previous project with QA were on level III
(this means more than 21 points). They liked more “wondering around”
together and exploring the virtual world than “gathering” points. They
completed the assignments, but they were never interested in acquiring
points, because they had 4-5 times more then the “beginners”.
When they were helping their colleagues by telling them about an
interesting quest they previously did, these two boys knew in which world
the quest is, and also knew how to find the co-ordinates of the location of
the quest.

Richard and Pontus are looking after a quest Viktor and Gabriel
already completed. Viktor is trying to find the world in which
the quest is.
Viktor: Unity.
Richard: Is it in Unity?
Viktor: Yes.
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Gabriel: *The village is called “Basic needs”.*

Georgiana: *Give them the co-ordinates.*

Gabriel: *Is the quest inside the pyramid?*

Viktor: *No, outside.*

Viktor: *18W 9N.*

I discovered how much they know about the game when of the beginners asked me how he can see the list of the worlds. I tried to find this function in the menu bar, in the “View” option, but I could not find it. Then Viktor told us that we have to press F9.

One of their main endeavours was to explore together the same location, so they can see each other. They were sitting at the computer all the time, being “in Quest Atlantis”, and were always waiting until the last 30 minutes period assigned to play other games. Their main activity in this setting was to do things together. Because they sat at the computers facing each other, thus being unable to see the other’s desktop, they were talking to each other, telling where they are, to which world they want to go, which are the co-ordinates of their location, asking if the other one wants to answer the same quest.

Gabriel: *Viktor, teleport yourself here, so you can see me.*

*(Gabriel is going over to Viktor and helps him. Vikor opens a quest, Gabriel is still standing by Viktor’s computer. I translate for them...)*

Gabriel and Viktor: *Should we write a poem? Nooo.*

*(Gabriel goes back to his computer.)*

Gabriel: *Viktor, do you see me?*

Viktor: *I see the quest, do you see me?*

Gabriel: *Yes, “Making a difference”...*

They were very “obedient”, being in QA for the entire designated period of the session, they never quarrelled or teased each other. When the fifth boy came, he was assimilated by this group, because he has the same temperament as they have.
They never complained about anything during the project. A short description of every session of group 2, according to the transcripts from the video recordings, is presented here:

<table>
<thead>
<tr>
<th>Week</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>They did not come the first week.</td>
</tr>
<tr>
<td>2</td>
<td>They arrive later. They already have accounts from a previous project with QA, so they start directly with playing. I tell them the assignment for the day. These two boys being placed face to face, cannot see the other's screen, therefore they ask each other a lot about the location. Viktor tells Gabriel to take the same quest as he does. I translate for them the quest. They complete it. After a while Viktor teleport to Story Inn and chooses a quest that implies to read a story and then answer questions from it. The Fifth Dimension assistant suggests to group 1 to choose a quest that group 2 answered in the previous project. Group 2 helps group 1 to find that quest. They remember the world, and now try to find the co-ordinates. When they found them, they tell them to group 1. They all meet in the same virtual world and try to spot each other on the location. Richard asks group 2 how many points they have. Group 2 answers to that. Viktor is praising Gabriel to me for his command of English language. Viktor is having problems in QA, he asks for help. I assist him. They choose another quest, individually, and answer to it. Meanwhile they meet in QA and wonder through it. They talk to each other, quietly. They are still and noiseless. Gabriel is not finished with his quest so he save it for the next week. When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk. After the break, they play games on Internet, in pairs.</td>
</tr>
<tr>
<td>3</td>
<td>Gabriel continues his quest from last week. I help him with scanning a caricature he has to attach to the quest answer. Viktor found something funny in QA. Gabriel and Richard goes to him and watch together his screen. I tell all of them the assignment for the day. Viktor finds a new quest, and starts to work with it. I translate it for him. Pontus is asking Viktor for his help with a quest; he needs the co-ordinates. They talk for a while, trying to find the quest. Viktor cannot find it, so he starts talking to Gabriel. Gabriel tells some co-ordinates to Viktor. Viktor teleports him there. They see each other. I ask Viktor what he is doing. He shows me, and then continues to talk to Gabriel about where they are in the QA. Gabriel is telling the co-ordinates to Viktor. Viktor goes there, and they both listen to some music in QA. Gabriel is describing for Viktor where he is now. Viktor finds a new quest. The Fifth Dimension assistant translates it for him. Gabriel chooses a quest, I translate it for him. They start working with the quests. When finished, they start wondering through QA. Viktor tells Gabriel the co-ordinates. Gabriel tells Viktor new co-ordinates and asks him to go there, so they can see each other. He goes over to Viktor and helps him. Viktor opens a quest, and ask for my help. I translate it for them and they decide they do not want to do this one. Gabriel is back on his place, asking Viktor if he sees him. They see each other and the same quest. They open it and decide to work with it. It is an interview. I translate for them and explain what they have to do. They start interviewing each other. The interviewer is writing down the answers. Now they are interviewing me. When finished, they ask Pontus for an interview. Richard gets curious and moves over to the three of them. Viktor goes back to his place and wanders through it, having fun. Gabriel goes to him, and looks at the screen, talking to Viktor. When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk.</td>
</tr>
</tbody>
</table>
After the break, they play games on Internet, in pairs.

4 The Fifth Dimension assistant asks Viktor how old he is. He says: 11. He finds a film about QA on QA, opens it and listen to it. The assistant asks him if he understood what they said. He says: NO. Gabriel continues with the interview from last week. He interviews now the assistant. Viktor goes to him. I tell everybody what the assignment for the day is. Group 1 is searching for a quest group 2 already answered. Viktor helps them with it. He tells them in which world the quest is. Gabriel tells them the name of the village. While they look for the quest, Viktor and Gabriel describe to each other where they are and what they see. Gabriel is trying to open a map of that world, but it does not work. Viktor finds a quest. The assistant translates it for him. He helps him with the answer. After submitting the quest, he starts to talk to Gabriel, telling him what he wants to do in QA. They wander together. When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk to each other. After the break, they play games on Internet, in pairs.

5 Viktor wants to show something to Gabriel, so Gabriel goes and looks at Viktors screen. He goes back to his place, but continue to talk to Viktor about their location in QA. Gabriel chooses a quest, I help him with the translation. Viktor asks him if he sees him. Gabriel goes to Viktor, points at the screen and says: “you are facing the wrong direction”. Gabriel goes back. They continue to talk about where they are in QA. Linnus is joining the group. It is his first week in QA. I register him and explain to him how the game functions. He chooses a quest, I translate it to him, and he starts working with it. Viktor asks Gabriel for help and asks where he is. They are searching for other questers in QA, Viktor finds one. I tell all of them the assignments for the day. The assistant helps Viktor with the translation of a quest. Now Gabriel opens a quest. The assistant and Viktor help him with it. I ask Gabriel to help group 1 with the location of a quest. Now the assistant helps Viktor with a quest. She explains what it is to be done. He completes it. Gabriel found a quest and says to Viktor to do the same quest. They complete it. Linnus asks for my help with another quest, I translate it for him. He starts working with it. Gabriel and Viktor wander together through QA and talk about it. They spot another quest. I help them with the translation, they start working with it.

When time for cookie break comes, both groups move to a table in the centre of the room, away from the computers, eat cakes and talk to each other. After the break, they play games on Internet, in pairs.

Fig. 11 – A brief description of all sessions of group 2.

6. REDESIGN SUGGESTIONS FOR PRODUCT IMPROVEMENT

Quest Atlantis as a software product can be used only by downloading it from Internet onto the hard disk. There are some minimum system requirements in order to be able to save it on the hard disk. The important things are the necessary free disk space (250 MB), the operative system (Microsoft Windows (98, Me, NT4, 2000, or XP)) and Internet connection (see Annex 2).
6.1 Participatory design method

During the five-week project, the children asked many times questions about how to use the game. My conclusion is that the design of the game is not as clear for children in this age group as it could be. Therefore I summoned all their questions as a “requirement specifications” for a better design of the software. I have reread all the transcriptions of the video recording, and selected all the questions about the functionality of the game children asked. For me, the questions are highlighting the weak aspects of the interface design, aspects that should be improved in order to facilitate children’s interaction with this game. Having the children actively involved in playing QA for five weeks helped me in regarding this aspect of the project as a participatory design that led to the requirement specifications, from the children’s perspective. I realised during the project that, even if some children were involved in participatory design when the game was created, there are still difficult things to understand for the children who play the final product now. Regularly software updates are run, but they are mostly about adding new functions that adapting the product to users’ needs. The easiest and most logical step to take for me was to listen to what children said about the game, and to watch their way of handling the product. In this manner, the users, with my help, engineered their own requirement specifications concerning this particular product. Putting myself in their position, trying to rationalise from an 11 years old child perspective, needs and skills, I was able to find solutions for a product redesign.

6.1.1 List of questions – children’s requirement specifications

There are 21 questions related to the usage of the game. Of course, the children were asking many more questions, but they are not relevant for my design improvement purpose.
1. Where do I see how many points I have?
2. How can I change my avatar?
3. How can I make the worlds’ list visible?
4. What does the different colours (on the quest rotating circle) mean?
5. How can I teleport myself?
6. How can I move faster?
7. Where do I find the features (of the chosen animal from a quest)?
8. How can I take my picture (print screen) here?
9. How can I save the picture in a document?
10. Where should I save the document?
11. I am in the middle of nowhere. Should it be something here? What do I do next?
12. To whom I send the quest?
13. How do I know what I have done after I send the answers?
14. Where should I click so I can read about it?
15. How can I go to another world?
16. Do you have as many worlds as I have?
17. Are there coming new quest every week?
18. Which quest should I choose?
19. Why do I look like a clown (in the Story Inn)?
20. Why did I get in here?
21. Can you go upstairs?

6.1.2 Redesign solutions

Having as a start point the children’s question, I have considered possible design changes that could make them understand the game’s functionalities easier. I tried to put myself in the shoes of an 11 years old child, and see the things from that perspective, taking into account their level of computer skills and experience.
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I spend many hours in QA testing all the functions and options in the game so I could avoid coming with design suggestions that are already implemented. When I did not understand something, I pressed the “Help” option in the menu bar. A long list of options popped-up up in a side-bar window. I read almost all of them, and they are definitely made for adults, i.e. the teachers that are one of the user group of QA. A child would not be able to make use of them.

I also observed which parts of the GUI the children use. They are using mostly the central window, where the virtual world is depicted. They also sometimes use some of the buttons from the side-bar window (i.e. changing the avatar, or checking maps). They never used menu bar options, and very rarely they used the buttons under the menu bar, with “Jump”, “Turn” and “Happy” functions. They used what was “visible” and at hand; they never “adventured” themselves in exploring the different options “hidden” in the menu bar. My view is that the interface is already rather advanced for a child to manage, therefore the solutions should simplify it. They have a certain amount of experience with computers, mostly (as I noted) from using Microsoft Office tools. These tools are standardised, therefore the improvements should use the “common” language and symbols embedded in those programs, so that children do not have to learn another program language. In this way, even if they play a new game, they are already familiarised with the symbols (Norman, 1990). Also, in my experience, children do not like so much to have an adult who tells them all the time how they should play a game. It diminishes the fun.

Based on these observations I developed four design principles in order to find suitable design improvements:

- The changes of the interface has to be as simple as possible.
- The interface should be adapted to a child’s expertise in computers.
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a method for involving users in participatory design.

- The teacher’s implication in assisting the child should be as reduced as possible.
- The solutions should mirror the conventional symbols and design.

The possible solutions to the children’s requirement specifications from the questions’ list are:

1. In the home window, there the points are displayed, one should simply have a larger character size, in bold. The used colour can also be more contrasting to the dark-yellow background. It this simple way the visual impact is bigger, and it becomes easier to spot the place were the points are displayed.

2. Instead of having a rather small symbol for the avatar in the upper left corner of the home window, with a very little chromatic contrast between it and the background, one can have it as the functions that are depicted in the middle section of the same side-bar window: have a coloured square button with the symbol for the avatar, with the button name AVATAR.

3. In addition to having to press F9 in order to make the list visible, one can have this function in the “View” scroll bar, as “worlds list”.

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4. When the children place the cursor on the rotating quest, a pop-up window can appear, that says “1 point quest”, “2 points quest”, ..., “10 points quest”.

5. In the menu bar there is a function for “teleport”, but the children were having problems understanding how to use it.

When you press the “to...” button, a pop-up window appears, with two text fields, one for the name of the worlds and one for the co-ordinates. Under these two text fields there is an example of how to write correctly the co-ordinates: 18N 9W. But there is another possibility to teleport yourself to a new world, by double-clicking on the name of the desired world from the worlds list. A possible solution is that, when you move the cursor on the names of the worlds, an explanation window will appear, with “teleport here by double-clicking”.

6. The possibility of moving faster or sliding laterally is described in the help window, in a long scrolling list of options. Instead one can have the very same functions in the “Options” drop-down menu, as “speed”, and “lateral slide”, with a short description in submenus for every option.
7. Some quests have links in the Resources section, where children can read about the topic of the quest. Because these links are the last ones in the quest window, and the preceding text about them is no different from the rest, it is easy to miss them. One can simply add another section, in bold, called **Links – here you find the information.**

8. In some quests, the children are supposed to find a location in QA and take a picture of themselves (the avatar) in front of the respective building. This can be very easily solved by writing the instruction in the quest after the task: *You take the picture of your avatar by pressing Shift+PrintScreen.*

9. None of the children knew how to save a document. The design of the QA can help them by giving them short instruction in the quest window. For example, one can write after the instruction "*take a picture of you in front of the Temple, save it in a document...*," the following: "*Open a Word document, press Ctrl+V, press on “File”, choose “Save as” and press on it./*"

10. In this case the designer cannot change much. One alternative can be to give the instruction on where you can save the document also in the quest window, but it becomes too long. It is simpler if one lets this question to be answered by the teachers involved in the project.

11. Sometimes when the children teleported themselves, they choose some random co-ordinates and got in the middle of a big, empty field, with no signs of civilisation around. It takes too long just to walk in a straight direction until you find something, children do not have patience with this. A solution could be, when teleporting to an "empty location" that a pop-up window appears: "try other co-ordinates".

12. When children are finished with answering a quest, they send the answer by clicking on a button “Submit your quest”. It takes few seconds until another window appears, that says: “Thank you for
submitting your quest”. One can simply add: ...to the Quest Atlantis Council”.

13. For a child to know what he has done so far, he has to click on “Info”, on the home page section, and there he has to double-click on “Read My Quests”. Design-wise this aspect is well solved; therefore I consider that the teacher can help the children with this information.

14. The solution to this question is identical with the one from number 7.

15. The teleportation is one of the most important functions in the game, but it is not “advertised”. When one logs in the QA, in the chat field a message appears: OTAK: “Hello, Georgiana! Welcome back”. One can continue in the same message with: “If you wish to go to another world, double-click on the names in the worlds list.”

16. This is a question that the teacher has to answer. I do not consider necessary a redesign.

17. Because the teacher is the one who chooses from the complete list of quests which ones are visible for children, it is his/her task to answer to this question. I do not consider necessary a redesign.

18. The rotating quest circles are placed aleatory in each world and village, therefore it is difficult to understand which one to open. Because Quest Atlantis is a game, a possibility can be to have the rules of the game as an object inside OTAK Hub that one can open, as it is the “Atlantis Legend” object. One can name it “How to use Atlantis”.

19. The avatar looks different in different worlds. In Story Inn the default avatar looks like a clown. In contrast to some other worlds, in this one there is a new function in the menu bar, called “Avatar”, where one can choose between several male and female avatars dressed as in fairy tales. But because there is also the symbol of the avatar in the home page section of the window, the children get confused. A solution can be to have an animated button called “change avatar” in the menu bar.
This question shows that children do not really understand from the beginning what “teleport” means, especially when they arrive “in the middle of nowhere”. If one takes into consideration my previous suggestion of redesigning the aspects related to teleportation, then this question can be avoided.

In the three-dimensional world there are a lot of objects. Sometimes one can go through walls, sometimes not. There are stairs, paintings, chairs, sofas. Some of them are links, some of them are just plain aesthetic object in this world. Therefore the question “can I go upstairs” is a legitimate one. A possible solution is to animate the objects that function as links, as it is already done with the quests, for example.

6.1.3 Summing up the redesign process

During the entire project the redesign process took shape gradually. The first stage was children playing the game. Listening to them as objectively as possible, I noticed that many of their questions were related to the functionality of the game/final product. My reaction to the children’s feedback on the game was: “why not using this questions as a ground for improvements?” Using my experience regarding design principles learned in the MDA program, and observing children interaction with the product, I formulated four design principles to be followed in the redesign process. Having these as a background and the children’s questions, the requirement specifications were clear. From this stage, I came up with the solutions I thought are best fitted to the problems. In Figure 12 I depict the steps of the redesign process, using my method of participatory design.
These suggestions, put into practice, can reshape the interface in a way that will facilitate children’s understating of the game, thus being able to play with less frustration moments and more enthusiasm and fun.

There is one difference between my method, and other PD methods, as i.e. future workshops, mock-up sessions, personas or partial involvement of users in the design and testing of the product\(^7\). The difference is that the involvement of the users in the other methods takes place before or during the design process, while in my method the involvement is taking place after the design process is finished, after the product is released.

I simply let the users use the final product\(^8\), and by voicing and doing they “tell” me what is wrong with the product. The children simply play the

\(^7\) For more information about these methods consult the referenced books about participatory design.

\(^8\) I do want to remind you that the creators of Quest Atlantis involved children in the design process of the software.
game, they ask questions about how to use the game, and the way they interact with the software tells which aspects can be improved in the final product. Of course, the solutions are limited, because there were only five children playing the game. The more children are used as a test group in this method, the more problems in the software can be revealed.

A clear advantage in this method is the fact that the users are unaware of their involvement in the participatory design, thus behaving in the interaction with the product in a most natural way. Thus, the researcher can observe the users feedback to the product in natural settings, with no restrictions or expectations. The users use the product in a relaxed, uninhibited, normal-level way, without being concerned about their performance, and they display the average level of computer skills.

Nevertheless, this participatory design method can be easily applied. The only things one need are a video camera and a group of children willing to play this game (assuming of course that one has the possibility and location for playing it).

7. DISCUSSION

This thesis’s focus was on two aspects: firstly, to study how one can capture children’s voice in such a way that one can improve the educational tool, and secondly to which extent such a virtual environment can be used for alternative educational purposes and how appropriate the software is to this goal.

During the project I elaborated a method of participatory design, based on the users involvement in the design process after the release of the final product.

My study shows that virtual environments, such as Quest Atlantis can function as alternative educational tools. They are created for educational purposes, and there are many forms of such alternative tools. Children are actively involved in the process of learning, they do it in a relaxed and fun
way. Because there is no teacher standing in front of the class who talks all the time, even if the children have to complete assignments, they do it with lack of reluctance. For them it is all about playing a game, not about answering questions.

Being an after-school activity, the atmosphere is different from regular school time, therefore children are managing rather difficult tasks in a relaxed manner. They are also agents of situation design, they complete the task as they see fit, they choose which activity to do in which order.

The quests are dealing with a large number of educational aspects, as health, culture, geography, biology etc. By answering these quests, children are involved in a multiple subject lesson, without noticing it. This aspect of "without noticing it" is important because it creates a different setting than the traditional education system.

The software, as a tool, especially the interface, needs a redesign process in order to be more adapted to children level of knowledge in computers. I took into consideration the design affordances and conventions (Norman, 1990) and the participatory design process that occurred at the Fifth Dimension site in order to engineer design solutions that are fitted to children’s computer experience. I strongly believe that this method of involving children/users in participatory design after the release of the final product can refine and improve the software to its best. The creators of Quest Atlantis involved children in the design of the game, but after releasing the product this involvement stopped, though it could be a good idea to continue and update the software.

If we consider as a scenario the possibility of using such alternative educational tools in an established educational system, there are some advantages and disadvantages one has to take into account. Again, I have to stretch that this is not an exhaustive enumeration, there are only the aspects I could think of based on my involvement in this project:
Children are agents of situation change.

Children are actively involved in the teaching/learning process.

There are quests that imply group work, small research projects outside the premises of the classroom.

Children deal with multitasks during one session.

Children learn things “without noticing it”, thus the stress factor is reduced.

Children learn how to select, search for and manipulate information.

Direct human interaction is reduced.

The “teaching” process implies mostly a computer-human interaction.

The discipline is loose.

Teachers/assistants cannot control the rhythm in which knowledge is acquired, without falling into the traditional system.

It becomes monotonous, because there are many quests that need only a written answer.

It can be hard for children to focus when dealing with multitasks.

Because the alternative tool in this case is a game, children have the tendency to cheat (copy and paste the answers).

Children can be trapped in manipulating information, without memorising and assimilating the information.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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Fig.13 – Advantages and disadvantages in the usage of alternative educational systems.

After the completion of this project I cannot visualise a future educational system based entirely on alternative educational tools. Even if the traditional system is in many respects an obsolete one, it has its advantages. Alternative educational tools are useful in after-school activities, as a supplement to the traditional educational system.
REFERENCES


Quest Atlantis as an alternative educational tool – Children’s voices on Quest Atlantis and a method for involving users in participatory design.


**Participatory design literature:**


Quest Atlantis as an alternative educational tool – Children’s voices on Quest Atlantis and a method for involving users in participatory design.

**Consulted literature:**

Quest Atlantis as an alternative educational tool – Children’s voices on Quest Atlantis and a method for involving users in participatory design.

ANNEX 1: QUEST

Community Mix

<table>
<thead>
<tr>
<th>Village: Community Power Village</th>
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<tr>
<td>QA Points:</td>
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<td>3</td>
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QA Quest Description

The communities of Atlantis have people from many ethnic backgrounds. Sometimes there is conflict because some groups feel left out. Do you know or understand what makes an ethnic group? In other words, what is an ethnic group or ethnicity? Your Quest is to write an article for a local newspaper about what defines an ethnic group and if you have different ethnic groups in your community. Can you determine if ethnicity is respected in your community? Also, we wondered if you see any advantages of having people from different ethnicity in your community.

Your Goal(s):

Your goal is to write an article for your local newspaper regarding ethnicity and your community.

- First, use different sources of media to determine what ethnic groups are part of your community. You may use newspapers, television, radio, pamphlets, or any other source of media information. You can also interview people you know.
- Decide if, after researching ethnicity in your community, you think these ethnic groups are respected and included in your community events.
- Did you discover that some groups have been or may feel left out of community events? What did you discover? Give examples.
- What are some advantages of having people from different ethnicities in your and your communities?
- Now develop an article for your local newspaper or put together a special class newsletter on ethnicity and your community.
- Submit your article to the Council through the OTAK.

Resources

Interview people in your community; access your local newspaper and other media in your community.
Annex 2 – technical description

**Minimum System Requirements:**

Pentium CPU 200mhz or equivalent; 64MB Memory; Microsoft Windows (98, Me, NT4, 2000, or XP); DirectX 3.0; 250MB free disk space. However, for the best possible experience in the OTAK the recommend is the following: Pentium II CPU 300mhz or equivalent; 128MB Memory; Microsoft Windows 98, Me, or 2000; 500MB free disk space; DirectX 8.0 or later; Windows Media Player 6.4 or later; 3D accelerated video card with at least 8MB and the latest drivers.

**Software Requirements:**

In order to run in the Direct3D accelerated mode, the OTAK requires DirectX 7.0 or later. If there is not at least DirectX 7.0 on the computer and want to run in Direct3D mode, one should download and install the latest DirectX from Microsoft. OpenGL and software modes do not require DirectX 7.0. Good performance in Direct3D and OpenGL modes also requires that one has the latest drivers installed for the 3D video card.

**Internet Connection:**

One must have an active connection to the Internet in order to access the OTAK. Additionally, if the computer is running behind a firewall, the OTAK must be properly configured to run behind a firewall.

**Hard Disk Space:**

The initial installation of Active Worlds will take less than 5MB of space on the hard disk. However, as one travels in the OTAK, the objects one encounters are cached to disk for faster loading on the next visit. This can require a substantial amount of additional disk space. The recommended space is at least 300MB free on the hard disk at all times for the best performance.