

**Utilizing scenarios in service idea generation
– a case of distant participation for a seminar**

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Abstract

The paper discusses the usage of scenarios in the service idea generation according to the innovation prototyping methodology. Innovation prototyping offers methods for service idea generation and service development in the area of mobile and ubicomp services. It focuses on services that of the future and strives to experiment their user acceptance and technological features in order to provide a proper basis for product development. Developers use scenarios for sharing service ideas and for analyzing them. The paper presents a case of service idea generation for distant participation for a seminar. The starting point is five scenarios or sets of scenarios that are related to topic and have been created earlier to describe research interests, assignment topics or have been found during user studies or from fantasy literature. These scenarios are compared and mixed in order to find common denominators. The mobility and ubicomp research interest and facilities of the research group are brought into the analysis. The common denominators are used to define idea generation focus so that the innovation prototyping round will contribute to the understanding of principles and features of mobile and ubicomp services rather than just produce another single prototype.

Introduction

The development in mobile and ubiquitous (ubicomp) computing is rapid. New network technologies, handheld and wearable gadgets etc. keep emerging. It is crucial to understand what kind of new services for end users the new technologies facilitate, how user acceptance is ensured and in what kind of environments the services and users meet in the future.

The service idea generation, service development and realization study future possibilities and needs in order to give a flying start for the product development. The Product Modeling and Realization Group (PM&RG) are developing an innovation prototyping methodology that offers approaches, methods and tools for the service idea generation of mobile and ubicomp services. Scenarios have proven to be a promising tool in innovation prototyping. They can be applied for many different purposes such as explaining a new idea to other developers, capturing the requirements for a system that is to be implemented and for defining a setting for experimenting both the correctness and the relevancy of a prototype. This paper discusses utilizing scenarios in the very beginning of service idea generation. Notice that in pre-product development the developers are faced with the fascinating and challenging task of being free to choose their directions as they have much less constraints than developers in the product development that has to match the order of a customer or the needs of certain user. Thus, the question is what to do, i.e., the developers have to find out what the problem is. The paper discusses how scenarios are useful in finding out features and common denominators of the problem in order to be able to focus the development through prototyping rounds.

The paper presents a case of distant participation for seminar to explain how scenarios are utilized in innovation prototyping. The paper begins with background and related research, which is followed by introduction of the existing scenarios that give a starting point. Then, the scenarios are mixed and compared in order to discover common denominators. Next, the research objectives of the group are brought to the mixture to elaborate the common denominators. Finally two initial distant participation topics are presented and the paper ends with conclusions.

Background and related research

The utilization of scenarios in service idea generation is a practical example of the brokering-based balancing of viewpoints [13]. Balance of viewpoints is a key objective for innovation prototyping. Scenarios are means of the brokering. They facilitate the search for the common denominators in order to discover how to focus the service idea generation and the following experimentations so that it leads to discovery of more denominators and laws that apply not just for a particular service but are feasible in future service idea generations. In this point the problem-oriented innovation prototyping differs from the solution-oriented requirements engineering [14].

Scenarios illustrate the service idea and the possibly already existing innovation prototypes to all the stakeholders. Technology experts relate scenarios to realizations possibilities and use cases [2]. Usability experts may use zero prototypes to study how users acceptance of the scenarios even before any particular prototypes are realized [11,12]. These two scenario related methods are not in the scope of this paper.

PM&RG is developing a user data structuring tool to facilitate the data from user studies to be interpreted interactively, cumulated round by round and made easily accessible for all the developers [7]. This tool is not explained here, but it facilitates the structuring of the scenarios and management of scenarios that is a precondition for their reuse the way that this paper explains.

There are numerous of definitions for scenarios, since the concept is used for several purposes and in various fields. The following three definitions are in harmony with the way we use the concept in this paper.

- A scenario is a description of an activity, in a narrative form. [9]
- A scenario is a sequence of actions showing how transition from one state to another might occur. [**Error! Reference source not found.**]
- The defining property of a scenario is that it projects a concrete description of activity that the user engages when performing a specific task, a description sufficiently detailed so that design implications can be inferred and reasoned about. Using scenarios in system development helps keep the future use of the envisioned system in view as the system is designed and implemented; it makes use concrete – which makes it easier to discuss use and to design use. [4]

The scenario definition is still evolving in PM&RG. Currently a scenario is defined as a story about situations and actions. It resembles a movie or a play script and is written in colloquial language. It consists of several scenes describing a series of actions. It contains concrete details on conditions and circumstances such as places, time, conditions, named participants, objects, communicated contents and issues.

Scenarios as input of different viewpoints

Distant participation is not a novel topic for PM&RG, since it has been tried out both due to practical necessity and as an assignment topic for a student group. Furthermore, related needs

and scenarios appear quite regularly in the idea generation sessions and usability tests. Thus the service idea generation round for distant participation starts by going through related scenarios.

Five scenarios or sets of scenarios were chosen as a starting point to inspire, support focusing and be tools for analysing the potential and relevant problems and needs in distant participation for a seminar. The cut versions of these scenarios given in the Appendices 1-5 aim to concretize the explanations and to illustrate how the scenarios vary in level of detail, ways of structuring, completeness etc. No doubt that the variation tells about lack of standardization and discipline. However, the different purposes and histories of the scenarios are best served by allowing flexible adjusting of the presentations as the following introductions show.

A need for distant participation in the PM&RG seminar triggered the service idea generation.

	The PM&RG seminar (Appendix 1)
Source/target	The scenario from reality describes a current seminar.
Who created and why	The lecturers and assistants of the seminar wrote the initial description as a part of a project plan for seeking resources for developing the seminar.
Content	The scenario describes the operation of a seminar that PM&RG is currently running every semester at HUT.
Problems	There is an acute need to improve the chances for participating to the seminar from other parts of Finland. Also there is need to facilitate following and taking the seminar one's own pace independently of the sessions.
Scenario stage	Currently the content is a description general seminar framework instead of a narration of the details of a certain round. Next stage of the scenario is a structured story with the details according to a certain instance.

The distant education scenario of the GO consortium gives a future oriented version of the PM&RG seminar. It points out how the expected technological outcomes of the GO consortium could be used to facilitate new service features.

	The distant education scenario of the GO consortium (Appendix 2)
Source/target	The scenario merges the research interests collected from the projects of the GO consortium and the current PM&RG seminar into a future oriented version. The research topics of the GO projects are the challenges of mobility management, security, multimedia and mobile services.
Who created and why	The scenario was made up by the PM&RG researchers while writing the common part for the project proposals of the GO consortium. The distant participation scenario is one of the three joint scenarios that concretize a common big picture of the consortium. In order to reach a proper focus the three scenarios were selected and condensed from the initial ten scenarios.
Content	In the scenario both the students and a visiting lecturer participate the seminar session distantly, even from a moving vehicle.
Problems	The scenario proposes context aware services, taking advantage of hotspots and utilization of ad hoc sets of gadgets.
Scenario stage	The scenario gives rough outline of the possibilities of distant participation. The projects will give priorities to the features and generate more precise descriptions as the development proceeds. The PM&RG seminar will act as a basis for experimenting and demonstrating the scenario in reality.

The negotiation and decision making aspects of a meeting provide another view to distant participation. The SmartMeeting system was realized according to the following scenario and thus is a potential tool for experimentation settings on distant participation.

	The SmartMeeting scenario (Appendix 3) [6]
Source/target	The scenario was put together from the components of observation of the weekly meetings of PM&RG (see Appendix 1), interviews of the group meetings and idea generation sessions with the technology experts.
Who created and why	The SmartMeeting student group wrote the scenario as part of their assignment. On the one hand the scenario was used for requirements elicitation, analysis and negotiation, documentation and validation. On the other hand it was used for testing that the SmartMeeting system worked correctly and for running field tests to experiment that it did the right things and fulfilled the requirements.
Content	The scenario introduces support for meetings that set the participants free of the necessity to be at the same place and to be bound to the duration of the face-to-face meeting.
Problems	The scenario presents the need for freeing users from the demand to be at the meeting place and to participate exactly during the meeting time. It demands that the users should be able to participate using the connections that happen to be available.
Scenario stage	The scenario has fulfilled its role as an assignment definition. Now it is part of the documentation and used for introducing the SmartMeeting system to new users and developers.

The scenarios from scifi and fantasy literature like the following Harry Potter scenario bring a futuristic view and encourage the developers to trouble free idea generation that may exceed beyond the current technology.

	Education scenarios from Harry Potter and scifi (Appendix 4) [3,8,15]
Source/target	The Harry Potter novels of J. K. Rowling are excellent sources of imaginary scenarios of ordinary objects with surprising behavior, fantastic communication and interaction styles etc.
Who created and why	The PM&RG collected the scenarios from the Harry Potter books in an idea generation sessions. Other scenarios from scifi literature were searched and elaborated by the students of the seminar From fiction to the fact - service scenarios for innovation prototypes seminar (T-106.850, Autumn 2002).
Content	The example scenario of the Appendix tells how a schoolgirl manages to attend several classes and even exams at once.
Problems	The scenario presents a very common problem of need for a possibility to participate several events at different places at once.
Scenario stage	The direct quote can be called as a raw scenario, since it is simply the original piece of text found from the book. The students of the From fact to fiction seminar first collected the initial raw scenarios and then derived new scenarios by merging, enhancing and adjusting to another environment or target user group.

The scenarios from the previous usability and user studies of the PM&RG provide a set of material that already has its justification in reliable experimentation settings and certain real user group.

	Scenarios from usability and user studies (Appendix 5) [5,7,11,12]
Source/target	Interviews of the study on mobile usage of Internet that were carried out on a target users group of HUT students.
Who created and why	Jarmo Parkkinen discovered the raw material while he was experimenting usability methods on mobile users as part of his M.Sc. thesis. The scenarios were structured while trying out a user data structuring tool .
Content	The scenarios describe small focused situations such and a cancelled lesson and a practice to have teamwork meetings in a cafeteria.
Problems	Sudden changes cause a need to be able to call for stand-ins and if that is not successful to fast and efficiently inform the cancellation to all participants. Students find it difficult to find time that suits all and a place that is easy to access to meet to discuss teamwork status and just chat. They choose a cafeteria.
Scenario stage	The scenario is has its basis on the user studies and it is presented in a structured form. The data is used for testing and reviewing the user data structuring tool that is being implemented, so its trace and links to related data and various models are being enhanced continuously.

Mixing distant participation scenarios to find common denominators

The scenarios represent different viewpoints and interests related to distant participation and seminar type of meetings. At first sight some of them appear to be quite similar and some very distinct. The developers have to discover how the scenarios are related to each other and what kind of emphasis each one has. Therefore the developers analyze the available scenarios side by side to for example draw tables like the one shown in Figure 1.

	PM&RG seminar	GO distant education	Smart-Meeting	Harry Potter	Usability and user studies
Distant participation	Students and working in other cities	Mobile user in mobile vehicle	Extending meeting time and place	Presence at several places	Coordination of team meetings
Seminar or meeting event	HUT seminar's sessions	Seminar relatet to projects	Weekly decision making	Witchcraft practicing and theory	Student groups assignments
Education	Knowledge and information transfer	Event to gather and transfer information	Transparent information among the team	Arithmancy, transfiguration, charms...	Exchange of information in teamwork
Target users	Advanced students, and experts	Experts of the consortium	Experts that are very mobile	Third year wizardry students	University students
Represents	Observed reality	Research plan	Functioning prototype	Futuristic ideas	User study results

Figure 1. A comparison of the scenarios

The scenarios give a concrete basis for discussing what the potential problems could be and how they could be discussed. Figure 1 summarizes how the different scenarios emphasize different things. The viewpoints of the scenarios may vary not only by ontology differences, but also by emphasizing different objectives and methods [13].

The scenarios are related to different aspects of distant participation such as geographic distance or coordination challenges. The examined events are not strictly seminars but meetings and study sessions with overlapping characteristics. Target users are university students and experts, with the exception of wizardry students who resemble the students of the university of technology in many characteristics such as craziness and curiosity.

Education was placed in the middle of the table of Figure 1, which reveals that it was originally considered to be the central concept and objective that would define the focus and methods for the service idea generation. However, the analysis of all the scenarios allowed the realization that it is not the centric topic, but more of a sidetrack.. Education was really not the driving force of any of the scenarios. The words fact that the trigger of the idea generation was a seminar, which is a method for education, and that the target group was university students, who are being educated, directed the attention to education. Education would have brought to the center the topic of pedagogy and the role division of teachers and pupil. However, none of the scenarios considered teaching methods and pedagogical challenges and, moreover, all the scenarios consist of groups of experts that collaborate in well-balanced manner and share the enthusiasm. The wizardry students are of course pupils, however, the chosen scenarios can be used even without emphasizing this. So, fortunately it was noticed in time that choosing education to be a common denominator would have taken the service idea generation to a sidetrack.

When all the related scenarios were collected and the mixed together, the actual common denominators surfaced. The following are among them: information transfer, coordination of communication, support for groups, freedom of place and freedom of time. Each of these concepts refers to a wide research area as such. Therefore, it is important to pay attention to the fact that their intersection and definitely not their union define the focus. In the following the topic of distant participation for a seminar is further focused according to the research viewpoints of the PM&RG.

Bringing in the viewpoints of research objectives and facilities

The research topic of PM&RG is mobile and ubicomp services. Therefore, the scenarios are viewed with spectacles that are looking for potential ideas for them. The following summarizes the research facilities and interest of the two main viewpoints of PM&RG.

Usability testing and user study facilities and interests

User acceptance is a crucial objective in the service idea generation and development. Therefore, the innovation prototyping methods involve usability and user study experts to the generation and development of the ideas. PM&RG strives to maintain a balance of the user viewpoint and the viewpoints of the various technology and business experts. Ensuring user acceptance is based on two approaches that have complement and share methods of each other. [5,11,12]

- Target of usability testing is the learn ability, efficiency, memorability, error frequency and subjective satisfaction [10] that the services provide for tasks. Available methods include heuristic evaluation by experts, usability tests of users are thinking aloud during tasks, logging usage data and interviews. Conventionally usability testing is carried out on an existing product or on its early versions.
- When the target is in generating new service ideas, user study methods are utilized to discover user needs and to evaluate the usefulness of services in a wider sense. Feasible methods include observation, focus group, role games and diaries. The aim to discover future needs adds difficulty to the task, since the experimentation settings should allow predicting future needs that rise in the future environments and cultures.

The following approaches and tools are being developed in PM&RG in order to on the one hand to strive to support studying services of the future and on the one hand to seek ways to ease the hard time consuming work of collecting, analyzing and managing the user data.

- Particular practices and methods are developed to allow usability tests and user studies on mobile and ubiquitous services. Usage of zero prototypes is just an example of this.
- The objectives of innovation prototyping state that the prototypes are built to ensure the focus of the experimentation setting and to include extra features to support the experimentation. For example an innovation prototype maybe customized for testing interruptions or include facilities for automatically logging of user's actions.
- Transliteration, structuring and analysis of the collected user data may be the most troublesome tasks of usability testing and user studies. A user data structuring tool is being developed and experimented for supporting these tasks. Furthermore, the tool aims to allow accumulation, reuse and sharing of user data.[7]

Appendix 5 shows some masked examples of scenarios found in previous user studies. The scenarios and related user data are available for the service idea generation for distant participation for a seminar.

Prototyping facilities and interests

PM&RG has quite ample selection of prototyping facilities that meet the needs of the prototyping interests. OtaDigi is a digital television station that can be used for testing digital television program formats, applications and services. The transmission can be customized to match the current needs of bandwidth, polarization etc. As the primary audience are the students of Helsinki University of Technology living in the Otaniemi area.

The operating system Symbian is created to satisfy the needs of mobile and ubiquitous devices. In contrast to traditional operating systems it can cope with the relatively small resources of these devices, like the very restricted memory and computational power. It also can cope with the various exceptional situations that occur in mobile environment, the most usual being the battery or network connection failures.

PM&RG is currently starting collaboration with the researchers of EVE – a virtual environment in Helsinki University of Technology. It provides a virtual environment that gives the user a capability to navigate through virtual spaces by different gadgets, trackers etc. EVE is ideal for developing and experimenting with new interaction techniques and devices. Of course, for a virtual environment there is a multitude of applications from scientific visualization to architecture and simulations.

Finally, Rollo is a ball robot developed by the Automation Technology laboratory in Helsinki University of Technology. Rollo can be modified and customized in many different ways, e.g., different kinds of interaction and controlling devices can be tested – cameras, WAP remote controls and so on. The co-operation with the Automation Technology laboratory ensures, that there is possibility to use Rollo as an example for various educational and research purposes.

Commitment to any single technology is very dangerous, as no technology is perfect – rather technologies can be seen as tools and platforms that are to be used if their restrictions and advantages are well balanced. There arises the concept of service diversity – there is a diversity of service, and each service must be built on the suitable platform rather than committing to one platform technology and forcing all services to fit in.

Collaboration of networks is a great step towards a world where there could realistically be use cases like “make a connection for video streaming” instead of the service developers who

have to cope with the varying and sometimes quite unreliable mobile connections. Different networks can be selected for different uses by a single device, and it is possible to switch the network connection from a network to another, if the connection fails or the quality of service (QoS) parameters must be changed thus, that the old connection cannot satisfy the needed QoS. The collaboration of networks would enable the user to download a video stream using WLAN (IEEE 802.11b) connection, but still be getting the audio stream from the GPRS network, if the WLAN network fails. There are many open questions in collaboration of networks, e.g., when the connection should be changed, what kind of data the user must see about the network connection, which components handle the actual vertical handovers (switching from network to another).

Deriving basis for new scenarios and experimentation

In order to decide how to progress the common denominators, scenarios and research facilities are organized according to their relationship. Sets of scenarios are related to sets of common denominators. These are related to sets of available research facilities for prototyping and usability tests and user studies. The order of organizing the relationships is not fixed, since it always depends on the current motivation. For example, if there is an urge to try out some prototyping facilities, they are chosen as a starting point to which the scenarios and common denominators are related. Likewise, application of a usability method or fascinating scenario may be the starting point for the organization.

	Transmission of seminar sessions	Configurable seminar material
Common denominators	Information transfer, support for groups, freedom of place	Information transfer, freedom of place, freedom of time
Source scenarios	PM&RG seminar, future: GO distant education	PM&RG seminar, future: GO distant education, SmartMeeting
Facilities for prototyping	OtaDigi digital TV, the simple distant participation equipment of PM&RG seminar, future: GO results, collaboration of networks	OtaDigi, digital TV Future: SmartMeeting
Facilities for usability testing and user study	PM&RG seminar environment with students available, resembling group of HUT student studied before, zero prototype composed of OtaDigi and PM&RG seminar	PM&RG seminar material, in particular demonstrations given by students, and students available, zero prototype composed of OtaDigi and PM&RG seminar
Experimentation	Usability testing and user study on students participating distantly	Usability testing and user study on organizers using the material

Figure 2. Two example rationales for usability and user studies

Two potential topics for usability tests and user tests are shown in Figure 2. The transmission of seminar sessions can be realized using digitalTV facilities and the the PM&RG seminar offers both target users an environment for the experimentation. Thus, there already exists a zero proto for usability tests and user studies [11,12]. Configurable seminar material means recording feasible pieces of material such as demonstrations given by students. The aim is to study how easy it is to use such material in configuring presentations for various purposes.

	Group aware communication toys	Delegated participation
Common denominators	Coordination of communication, support for groups, freedom of place	Coordination of communication, support for groups, freedom of place, freedom of time

Source scenarios	Harry Potter, usability and user studies, SmartMeeting	Harry Potter, usability and user studies, future: GO distant education
Facilities for prototyping	Symbian and gadgets, SmartMeeting, future: Rollo, EVE, Collaboration of networks	Symbian and gadgets, SmartMeeting, future: Rollo, EVE, Collaboration of networks
Facilities for usability testing and user study	Not defined yet	Not defined yet
Experimentation	Technology experimentations on e.g. new interfaces	Technology experimentation on e.g. interaction for participation

Figure 3. Two examples for technology experimentation

For the examples of Figure 3 no obvious zero prototypes, so they lead to technology experimentation for which the focus is to be determined later. The group aware communication toys are analyzed by mapping together the future oriented scenarios e.g. from Harry Potter books and the available platforms and inspiring gadgets. The delegated participation refers to the presence in two places that appears in the scifi literature and the usage of human, robot or avatar delegates for being able to participate in two places at a time.

Practice has shown that it is not sensible to generate an exhaustive listing of all possible organizations, but it is more feasible to generate a couple of interesting ones and enhance them through iterative rounds.

The service idea generation proceeds roughly as follows for each column. The source scenarios are mixed, combined and focused to generate new enhanced scenarios. The experimentation and required setting is then planned in detail and the enhanced scenarios are revised if necessary. Next, the experimentation setting is realized. Finally the experimentation is carried out and the results are analyzed to provide basis for next iteration rounds.

Conclusions

It is generally recognized that scenarios are suitable means for the collaboration of the various stakeholders of product development. The given case supports this by showing how scenarios are used in service idea generation. Here, scenarios are used as a kind of handles for finding suitable candidates for reuse from the previously generated service ideas, built prototypes and experimentation results.

Scenarios are good means for brokering the different viewpoints to the services, because they are explained in colloquial language makes them understandable and they allow inclusion of different kinds of details for mediation of the rationale. Thus, the developers representing various fields of expertise such as usability, software and business are able to demonstrate their viewpoints and avoid unnecessary compromises.

Moreover, the scenarios can be used for analyzing what the viewpoints or features of the application field, here mobile and ubicomp services that they present. This way it is possible to find common denominators of the scenarios and services that they represent. This supports the innovation prototyping objective of not just producing separate service ideas, but to rather strive for discovering principles, laws and practices that are widely reusable.

The analysis of common denominators of the starting point scenarios ensures that a proper focus is set and that it is decided consciously. A good example of this is how pedagogy was discovered to be a sidetrack in the given case. The service idea generation was triggered by a need for distant participation in an existing seminar at the university, which intuitively made

education and pedagogy a focus of the service idea generation. The seminar scenario was then supplemented and mixed with other scenarios of interest to the research group. When the common denominators were analyzed none of the scenarios, even the seminar one, emphasized it.

The research work on the utilization of scenarios in service idea generation continues. Approaches, methods and tools are needed to achieve better systematization and management of scenarios while still allowing flexibility. The distant participation will be researched further by analyzing the four topics.

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Appendix 1: Information transfer of the PM&RG

The PM&RG seminar as a basis for a scenario

Each semester PM&RG arranges a seminar on a varying topic related to mobile and ubiquitous computing and innovation prototyping.

Target group:

- majoring, graduate, and post-graduate students of HUT
- students from companies and research groups
- company and research personnel updating their knowledge

The seminar consists of

- weekly seminar sessions of lectures and presentations that typically consist of going through a set of transparencies using speakers own laptop, showing some demonstrations (live or video), small teamwork exercises and lots of discussion
 - lectures given by PM&RG members and visiting lecturers
 - presentations by students and student groups for receiving feedback from supervisors, other groups and invited audience
- small background surveys by individual students
- assignments of student groups
 - 2-5 students
 - practical research, typically prototyping, experimentation or idea generation
 - supervised by company experts and HUT staff

Characteristics of the seminar

- for PM&RG the seminar allows transferring latest research results to students and to educate current and future researchers
- the seminar is a crucial means for knowledge transfer between universities and companies as well as between different companies and among research groups.
- the seminar sessions have features of meetings, since several sessions consist of student reporting and interaction is encouraged e.g. by small teamwork's

Discovered needs

- since most of the seminar students and other participants work full time and some come from other parts of Finland, there is a real urge to utilize technology to get rid of the time and place restrictions.

Weekly meetings of the PM&RG as basis for a scenario

The weekly internal meetings of PM&RG involve as distant participant cooperative researchers from companies. Combinations of various off-the-shelf methods and technologies are experimented. These include BSCW (Basic Support for Collaborative Work) for maintaining and sharing meeting minutes and other documentation, IRC for discussions, web camera for view to the meeting room, etc.

Target group:

- Members of the research group
- Hangarounds which refers to researchers from other research groups, students and experts from companies that cooperate actively

The meetings consist of going through practical matters related to the research group activities and presentations given either by the members or by invited visitors.

Appendix 2: The distant education scenario of the GO consortium

Source: GO project plan 2003



GO-PROD project arranges a seminar every semester. The purpose is to gather and transfer all knowledge of GO consortium that GO-PROD forms with three other projects. Intensive collaboration with companies located in different cities requires allowing remote participation to the seminar. Seminar sessions are transmitted to remote participants via slide show, voice and video.



Harald is the over-guru of his field, and he has promised to give a lecture at a GO-PROD seminar session. Suddenly he has to visit an important client in Florida and is not able to attend the seminar session. He contacts his colleague Hannah, who volunteers to give Harald's presentation.

Hannah is a bit insecure and needs support during the lecture. Harald, who is sitting in an airplane over the Atlantic, notices that he has to set up the connection to seminar over the network using the camera and PDA equipment that he happens to be carrying. This way he can assist Hannah with the presentation and answer the tough questions.

Key interests of the projects of the GO consortium

- Mobility management: QoS aspects of mobility to handle the streaming, network mobility to allow attending the lectures in vehicles, network level multicast for mobile users/nodes
- Security: possible confidentiality issues, ensuring integrity and authenticity of information
- Multimedia: time-based hyperlinked presentations, streaming real-time media
- Services: service management, context aware services, delegating rights to other users, gadgets or services, gadgets of hotspots, hotspots and future needs (upload now consume later)

Appendix 3: The SmartMeeting scenario

The following scenario is from the student report:

Kesti-Helia, A., Kokkonen E., Keski-Luopa, J. and Koskinen M., 2002, Requirements specification, SmartMeetig, T-76.115 Software project, February 2002.

The meeting

Cast of the scenario:

- Bridget the secretary
- Victor
- St. John
- Cathy
- Ann
- Bob

A.1 Preliminary stage

Story: “Three days before the meeting Bridget decides to create a new meeting to the SmartMeeting system...”

A.2. Somewhere, sometime

Story: “...Cathy receives E-mail about this meeting...Ann receives an sms because she has chosen it when defining her user profile.”

A.3 The meeting

Story: “ After the chairman of the meeting has opened the meeting, Bridget marks the meeting opened...At the same time she welcomes all the remote participants to the meeting: St.John (via www) and Cathy (via sms)...”

“Victor receives an SMS and informs that he must leave. He continues to participate the meeting with his laptop. Bridget changes the status of Victor to remote participant...”

“...Eventually, a vote has to take place. Bridget selects “voting mode” from her SmartMeeting™ client software. The systems sends an sms to Cathy to get her opinion and asks the web users for their vote...”

A.4 After the meeting

Story: “...Bridget closes the meeting and thus the meeting minutes are complete...”

B. Scenario from the remote participant point of view

Story: “...Matt logs in the system and selects one of the coming meetings and rapidly the agenda of the meeting. He decides to participate so he registers himself to this event...He also specifies the media for communication in the assembly of the meeting. He selects chat option...” “...and that is why he can’t participate by web at the beginning of the assembly...”

“...At 16 o’clock Matti calls speakerphone system and participates to the assembly. After discussing a while the battery of his cell phone is so low that he has to continue participating in the decision making only by receiving and sending SMS messages with SmartMeeting system ...”

Appendix 4: Scifi scenarios related to education

Scenarios and service ideas from student assignments on scifi

The following service idea and raw scenario are from the student report:

Lahtinen J., Sarha T. and Seppä O., 2002, Älytalo. – sulautetut palvelut. From fiction to the fact - service scenarios for innovation prototypes seminar, T-106.850 Seminar on software technology, Helsinki university of technology. December 2002.

Service: Teaching

The service offers to the user interactive teaching on various (any) topics that the user might need to learn about. Instead of providing the user with a text for reading, the user is provided with a teacher that is able to answer questions etc.

Type of service: Information service

Target users of the service: Residents of the building, maintenance man

Raw scenarios for the service: scenario 5 introducing a foreign culture

Raw scenario 5: introducing a foreign culture

Story: A robot called Flere-Imsaho explains to Gurgeh the cultural differences that he is likely to meet in the Imperium.

Pages: 131-133 (of the Finnish edition)

Source book: Banks, Ian M., The Player of Games, 309 pages, Orbit, ISBN: 1857231465, 1989.

Story of the book: The story tells about a distant future. Jernau Gurgeh is a famed master game player who is invited to a game tournament at a small alien empire. This is a game so complex, so like life itself, that the winner becomes emperor.

Education scenarios from Harry Potter

Raw scenario: Attending several classes simultaneously

Story: “ Harry and Ron had given up asking her how she was managing to attend several classes at once, but they couldn’t restrain themselves when they saw the exam timetable she had drawn up for herself. The first column read:

Monday

9 o’clock, Arithmancy

9 o’clock Transfiguration

Lunch...”

“...how you’re going to sit two exams at once?...”

Source book: Rowling, J. K., Harry Potter and the Prisoner of Azkaban, 1999, 317 pages, Bloomsbury Publishing, ISBN o 7475 4629 0, 1999.

Pages: 231 –232

Appendix 5: Scenarios from usability and user studies

Source: Interviews of the study on mobile usage of Internet that were carried out as a part of a round of usability testing and user studies carried out by Jarmo Parkkinen as part of his M.Sc. thesis.

Scenario: Cancelled judo lesson

Participants:

- April, 20-25 years old, student
- judo teacher, judo students
- organizer of the judo classes

Locations:

- computer room, computer science building, sports hall, Otaniemi campus

Story:

“...On Monday I was in the computer room working on my programming assignment. The judo teacher had become ill. My mobile phone rang and I was asked: ‘Would you like to give a judo lesson?’ I refused.

Usually e-mail or note on the door is used, if the lessons are cancelled...”

Problems and needs:

- Handling sudden changes, notifying and informing
- Urgent messages for informing cancellations and search stand-ins

Scenario: Teamwork at a cafeteria

Participants:

- May, 20-25 years old, student
- student group: June, Huey, Dewey and Louie

Locations:

- Waltz cafeteria, Helsinki

Story:

“...During Autumn I was first time doing a teamwork at the Waltz cafeteria. Then we used it also during the design course. It is convenient for meeting, even if we end up chatting and not working...”

The practice was started when we were in a terrible rush with a project. We selected Tuesday. To meet every morning. The meetings were always 7:00 on Thursdays at Waltz.

There were five of us, but two tend to sleep in. Everybody arrives, at the latest after somebody phones and wakes him or her up....

The report of the design course was submitted at Easter. Now we are beginning another project and have meeting next Thursday at 7:00...”

Problems and needs:

- Teamwork services
- Reminder and wake up services