IBM Research Report

Scenarios in Practice

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Introduction

Scenarios have been discussed in the HCI literature since at least 1992. Since then, they have come into the mainstream: There are books and tutorials on the topic; every published UCD method incorporates them in some form. The current challenge facing the scenario community is making scenario usage more effective and efficient in industry projects. This workshop fills that need by focusing on "scenarios in practice" as opposed to "the theory of scenarios" or "anything about scenarios".

Although we use the term "scenarios", the workshop welcomed various communities of practice including personas, stories, and use cases. What was common among the participants is a user-centered perspective. The word "scenario" in this report refers to any of these communities of practice.

The scope of this workshop includes the overlapping concerns of: deploying a scenario methodology into a project environment, integrating scenarios with other UCD methods, craft and quality in writing scenarios, and tailoring scenarios to various project contexts. The workshop was divided into four segments, which loosely follow the phases of writing and using scenarios: Identifying where scenarios come from, defining scenario topics, writing scenario content, and using scenarios that have been written.

This report summarizes the key points from each segment of the workshop. To stimulate discussion, participants completed several exercises. The exercise material is summarized in the appendix.

Where scenarios come from

The validity of a scenario is best established by demonstrating that a quality process generated it. This segment discussed the nature of that process, focusing on the discussions that occur among stakeholder groups and issues of bias.

Types of stakeholders and biases
Various types of people can, and should, be involved in generating and refining scenarios. These include project sponsors, marketing staff, system users, system builders, and UCD professionals. The biases sometimes observed in each stakeholder type were discussed. Project sponsors and marketing staff are prone to what one workshop participant called "user requirement fantasies". They are able to generate stories that they claim illustrate user needs but, in fact, are not valid. A shortcoming of current system users is that they sometimes have ingrained beliefs about the current way of doing things and have difficulty changing their frame of reference. System builders are sometimes prone to focus too quickly on the solution's description without much reflection on

the scenario of use, either currently or for their envisioned solution. Ironically, this workshop did not discuss the biases of the UCD role.

Several position papers touched on this topic as well:

- From a participatory design perspective, there is particular concern about people such as UCD practitioners serving as intermediaries of users' stories. There is an ethical dimension to the concern as well as a view that stories told or retold by intermediaries are bound to have various types of shortfalls, such as being incomplete and partisan. Also, scenarios can be dangerous because of their alikeness to actual user stories; the audience of scenarios may be deceived into believing that these are the stories of users and that they (the audience) understand the stories (that is, they empathize with the users).
- In the domain of aviation accident investigation, research has shown that the background of the analyst strongly affects the factors that the analyst presents as central to the accident.

Finally, the workshop exercises shed light on this topic as well. What can be seen from the scenarios generated during this workshop is not so much bias as variability. Each participant worked on the same problem but generated scenarios that differed in the aspects highlighted. This suggests that, as with design, various teams will generate differing solutions to the same assignment.

Avoiding vs. Balancing Bias
Given that bias is endemic but can undermine scenario validity, what should be done? The goal of avoiding or removing bias was seen as unattainable. Instead, the proposed strategy might be summarized as: recognize, balance, and leverage. First, the nature of bias needs to be thought of explicitly in planning a scenario writing activity. Second, engage each stakeholder group to balance and counteract each type of bias. This follows the approach used in aviation accident analysis, where various technical disciplines are engaged. The goal is to cancel out various biases rather than pursue a quixotic quest for objectivity. Finally, the presence of differing biases can be leveraged.

A phenomenon sometimes seen in group settings is false consensus, as when a group leader says, "Should we take a break now?" If no one says anything, the leader concludes that there is a consensus not to take a break. Similarly, there may be pressures for people to go along with someone's proposed draft scenario. A skillful moderator can sometimes highlight areas where various stakeholders disagree and use that situation to generate more possibilities. So, rather than gravitating to the lowest common denominator, the group can consider a wider set of possibilities than it could if the other stakeholder groups had not participated. As well, these diverging perspectives can be used to help stakeholders realize that their perspective is not the only one. For example, a marketing sponsor may let go of its marketing fantasy after the user gives it a "thumbs down". Also, a system builder may come to realize that there is not currently just one well-defined problem with an obvious technical solution.

Drafting scenario topics

The task of defining scenario topics falls between gathering the critical mass of knowledge needed to write some scenarios and the actual writing of scenarios, that is, fleshing out scenario content. This task is similar to the task of creating an outline before starting to write a document or book. As with that authoring task, defining scenario topics can be done rigorously to provide a "fill in the blanks" roadmap, or sketchily as a means to indicate a general direction and set of points to cover. By analogy to design, defining scenario topics can be seen as the high-level design that guides the subsequent detailed design. This segment discussed the nature of that process, focusing on the goal of defining a set of topics that provide good coverage, that is, that

don't overlook or overemphasize aspects of the problem domain to be addressed by a new system being designed.

<u>Nature of coverage</u>
Three types of coverage were identified: exhaustive, representative, and useful. Exhaustive coverage was seen as unattainable, much as unbiased scenarios are unattainable. Representative coverage was seen as an even less attainable goal. Certainly, it is possible to evaluate various scenario topic sets and state that one set seems more representative than the other. However, there is no absolute measure of representativity. Finally, however, it was seen as feasible that a scenario set of topics be considered useful. That is, it is easy to establish the ways in which a system design is better as a result of the contribution of scenarios.

The quality of the selection process was seen as more important than the number of scenarios in determining coverage. That is, a small set of scenario topics with a solid rationale for each scenario provides better coverage than a larger number of scenarios that were included without the benefit of a good screening process.

<u>Tips for improving coverage</u>
The following points provide practical guidance on this topic:

- More scenarios are not necessarily better. Consider the usefulness and value of the proposed scenario compared to the cost of writing and using it. Perhaps that resource could be better used elsewhere.
- Prior to defining scenario topics, do some kind of modeling of the domain to define categories that serve as prompts for scenario topics. One type of analysis is defining themes or aspects that arise from the preliminary user research.
- Include scenarios that illustrate normal cases vs. failure cases.
- Consider writing at a more abstract level. A more abstractly written scenario or persona can cover more ground than a very specific topic. For example compare the following: (1) Mary cancels the Marketing Dept. meeting because she is sick vs. (2) Department manager cancels regular department meeting. However, this approach has the downsides of losing specificity and vividness.
- A sanity check heuristic is that each persona (or actor or role) should appear in at least one scenario.

Writing scenario content

Writing scenario content involves balancing the provision of key details for reflection with the avoidance of extraneous clutter. Another aspect of writing scenario content is the document structure or template used.

<u>Types of details</u>
There are various types of details that might be considered for inclusion in a scenario. First, there are details that describe a user's internal state or explain why that person wants to perform the actions in the scenario. For example, a scenario might state that the user prefers to do the Web search task at the office rather than from her home machine. This type of detail is one of the key differences between many other forms of analysis, including use cases.

Second, there are details that describe the envisioned functionality to be provided by the system. The UI presentation of that functionality could be described or not. For example, consider the following: (1) the user clicks the link labeled "View swim class schedule" vs. (2) the user views the list of available swimming classes. In the previous examples, a proposal or decision has been made that the system will display swimming class information.

Third, details can be classified as to whether they describe the task flow, static user traits, or static environment features. Generally, scenario content tends to emphasize task flow, then user traits, and least, environment features. So for example, a scenario about signing up for swimming classes is likely to include many task flow details (e.g., browse list of courses), less likely to have much detail on the user (e.g., the person is a senior citizen), and least likely to describe the environment (e.g., whether the user is accessing the Web from her home or from the library).

Finally, details can be categorized as to whether they pertain directly to the system being designed or not. Some scenario writers write in a use-case style and stick directly with the concerns of the system. Others explicitly include extraneous details to portray that using the system is not the center of the user's world; it is just a small part. In his book *Problem Frames*, the software engineering methodologist Michael Jackson has recognized this duality and exhorts system designers to step further into the user's world. However, a possible downside of highly emphasizing the user's world is that important technical design concerns may be overlooked.

Scenario Structure
The scenarios written by workshop participants were strikingly different in format, ranging from unstructured narrative text to highly structured documents. The following formats were observed in the workshop:
- Sections for (user) motivation, task specifics, other context, potential errors
- A tabular format with one column for the user and one for the system
- Sections for themes (to incorporate in the scenario), scenario
- Sections for roles, context for each role, tasks for each role, scenario narrative
- Sections for background on the user and the environment, situation and user goals, method used to pursue the goals

Working with scenarios

Once scenarios have been written, they have several possible uses. This segment discussed several of these uses.

Uses of scenarios
First, scenarios can serve as part of a contract with product development. That is, the development process can be such that development leads review and sign-off on the scenarios. In so doing, development commits that their design will support the specified scenarios. The scenarios state that certain types of people, in certain types of environments, must be able to use the system in certain ways to achieve certain goals. It becomes relatively easy to measure whether a given design meets these objectives. Users can be asked to perform the specified scenarios and data can be recorded on their ability to complete the scenario and their satisfaction with the product.

A second use of scenarios is to hand them off to designers to create a design concept. Scenarios can be used to suggest or even prescribe a design direction. The DVD for *Lord of the Rings* includes a special feature that illustrates this process. Various design disciplines (carpentry, graphical design, etc.) were given scenario-like materials and the designers responded to those materials by producing design concepts.

A third use of scenarios is to hand them off to others for reuse. Manual writers weave scenario materials into their material, perhaps in the form of examples. Marketing copy writers have also found UCD scenarios reusable. Finally, system tests can use the UCD scenarios as an input in writing their system test scenarios.

A fourth use of scenarios is to study them for design rationale. Long after the fact, reasons for a design decision can be inferred by examining the scenarios that were used to guide the design. As well, the scenarios might also have more explicit rationale material in the form of claims analysis or other commentary on the scenarios: the scenarios don't always speak for themselves.

Finally, scenarios can help create common ground among a diverse design team. Scenarios can educate new team members. As well, scenarios can help bring consensus to a divisive issue or focus to a discursive discussion.

Conclusion

There are a wide range of practical issues in using scenarios effectively in product development. This workshop limited its focus to a few aspects to enable a satisfactory depth of discussion.

Notices
This document represents the views of the authors rather than IBM.

Appendix 1 – Exercise Descriptions

<u>Introduction</u>
To stimulate discussion, participants completed several exercises. The exercise material is summarized in this appendix. The instructions for each exercise are provided below.

<u>Exercise #1 for segment "Where scenarios come from"</u>

Background
You work for a large web consulting firm that has been asked to bid on a proposed project for building a web site for a particular city. The proposal is in a very preliminary stage right now, with no fixed constraints assumed regarding timing or cost. However, there is a strong commitment to user-centered design, and your management hopes that your firm's scenario-based development history and methods will help to win the project.

Instructions
Develop a semi-ordered list of activities that your firm would do to <u>initiate</u> a scenario-based development process for such a project. Do not write any scenarios at this point, rather focus on the preparatory activities that you would carry out *prior* to scenario generation. Wherever there is a logical or pragmatic ordering or dependency (including iteration), be sure to indicate this. Your high-level goal at this point is to persuade the city management that you will be able to build the "right" system for their population.

<u>Exercise #2 for segment "Where scenarios come from"</u>

Background
Same as before, but now due to a significant economic downturn, several constraints have been added to the project planning process. Most relevant to your proposal preparation is that the preparatory activities proposed must be doable in one week by two analysts working fulltime.

Instructions
Working from your own list or the master list generated by the group, develop a prioritization scheme for the preparatory activities described earlier. For example, you might use a three-level classification might, along the lines of "essential", "desirable", and "optional". If the scheme includes some sort of qualification of the activity (e.g., how much time or effort allotted), indicate this with an annotation.

<u>Exercise #1 for segment "Defining scenario topics"</u>

Background
You work for a large web consulting firm. You have been told to attend a meeting. All you know is that there will be a group of direction setters (project sponsor, and technical and strategy leads) discussing their views on the general direction for a web site for particular city. You are expected to contribute proposals and provide informed reaction to the proposals of others.

To prepare, you plan to think through some scenario topics. This will stimulate your reflection on this project and can be used to buttress your opinions in the meeting.

Instructions

Generate as many scenario topics as you can. If the title is not self-explanatory, provide some comments about the point of the scenario. Identity the most important one (e.g., focal scenario).

Example for a calendar tool:
 Schedule a weekly status meeting for a cross-site team
  o Illustrates: repeating meeting, cross-site meeting

Exercise #2 for segment "Defining scenario topics"

Background
You are a user interaction designer assigned to enhance a city web site. Currently, the site displays the schedule of swimming classes. Your assignment is to design a UI to support online registration for swimming classes.

Instructions
<same as for Exercise 1>

Exercise #1 for segment "Writing scenario content"

Instructions
Flesh out scenario details for the following scenario topic. Use the format and style that you would normally use.

Topic: A person has just moved to this city and they want to get acquainted with the resources; specifically, they want to find facilities/services targeted to senior citizens nearby.

Exercise #2 for segment "Writing scenario content"

Instructions
Flesh out scenario details for the following scenario topic. Use the format and style that you would normally use.

Topic: A mother wants to register two kids for different courses. She hopes to find a pool where they can both go on the same evening.

Appendix 2 – Results for Selected Exercises

Results for Exercise #1 for segment "Defining scenario topics"

Participant 1
Scenario titles
- Amy is moving to "the city"
- Jack is thinking about moving to "the city"
- Cheryl checks the school zoning changes
- Geoff checks to see who was elected mayor
- Matt looks for something to do this weekend
- Suzanne visits the city on business

Personas
- Amy – interested in tolls, traffic, etc; weather, real estate, all you need to know to move here
- Jack – similar interests to Amy but looking at more appealing things about the city to see why he should move there
- Cheryl – interested in things that are going to affect her family
- Geoff – interested in government
- Matt – interested in specific entertainment within a certain time frame
- Suzanne – interested in places to eat, things to do given limited time

Participant 2
Diagram
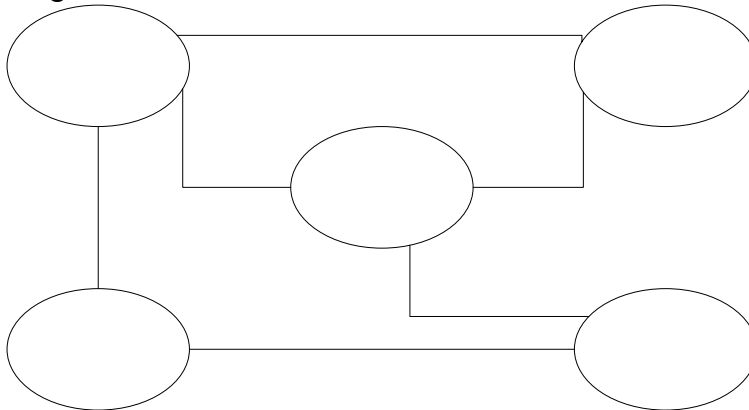
Scenarios
- Council member collects input from Rotary Club, i.e. plans for downtown parking garage
- Pizza parlors coordinate their deliveries
- Council tracks development hot spots
- Mr. Santero sets up neighborhood discussion regarding downtown parking garage
- Susan notifies quilting club about upcoming concern with URL for tickets

<u>Participant 3</u>
Types of users
- Visitor – business visitor, tourist
- Resident – new resident, long-time resident
- Business – local business, non-local business considering a move
- City employee – staff, political

Scenario titles
- Tourist interested in attractions
- Resident interested in garbage collection information
- City wants to attract new businesses
- Resident wants to participate in council business
- New resident wants to learn about resources in the neighborhood

<u>Participant 4</u>
Basic Navigation
- Search a specific keyword on the site
- Find the home page when you come to a page from a search engine

Specific topics on the city site
- Find an interesting event in the city
- Find the contact info of the information on the page

Universal design issues, e.g., color coding on the website.

Results for Exercise #2 for segment "Defining scenario topics"

<u>Participant 5</u>
Domain
- City website
  - Tourism
  - Health
  - Housing
  - Leisure
    - Gym, athletics, swimming…

Roles (related to swimming pool)
Swimmers, spectators, trainers, clubs, schools, employees

Scenarios
- Stroke patient about to be released home needs swimming exercise, physiotherapist; tries to find a swimming session
- Mother has desire to have her daughter learn to swim; wants her coached, wants to view class
- School wants to book a session for weekly visits
- Group of parents want to book pool for a birthday party
- Budding Olympic athlete works in an intensive training period
- Pool employee wants to announce that the pool is closed for maintenance
- Regular swimmer wants to find a group to join

- Visitor wants pool information, e.g., type of pool, hours of operation

Participant 6
Actors
- Member of swimming class, teacher of swimming class, …
Topics
- Normal registration
  - Single member
  - Teacher
- Registration with problems
  - Time conflict
  - …
- Used parts
  - Log-on
  - ….

Participant 7
Scenarios
- Swimming pool chief advertises swim meet
- Father selects beginner session for daughter
- Teacher checks time of weekly school swim lessons
- Tourist stumbles across swim page while browsing the "what's on" section of the local paper
Notes
- Detailed description of visitor visiting pool when closed (error)
- Detailed description of poorly attended special event for mothers and babies.

Results for Exercise #1 for segment "Writing scenario content"

Participant 1
- Jonathan, 65, retired fire chief, loves to play poker
- Goal: get acquainted with city and find facilities and services targeted to seniors
- Title: Jonathan moves to "the city"

Jonathan just recently retired and moved to the city. He wants to learn more about the city and what kinds of things there are to do. He types in the name of the city and state in Google and finds the city's main web site. He accesses the site.

He scans through the names of the various sections in the left menu and clicks on the New Resident. This brings him to a page where he can get all sorts of info. There is a link to a checklist for new residents, information regarding entertainment, banks, the post office, churches, etc. He clicks the entertainment link and views a page listing various activities and clubs.

He notices a search dialog box in the upper corner and types "senior citizen". This brings him to a page filled with search results about senior citizens living in the city, facilities

and services, etc. he notices a posting seeking a new member for a seniors only poker club. He clicks the link, learns more about the invitation, and clicks a link to send email indicating that he is interested. He uses the browser Back button and bookmarks the search results page. He also clicks the Bookmark this Site button in the left menu….

Participant 2
Part 1 (Theme and Persona)
- Theme - Wants to join "her" community
- Connie, a retired school teacher, recently widowed. Chose "this city" because it is popular among retirees. Likes to sing as well as listen to music; bird-watching is a hobby. Comfortable with the web; has a dial-up connection from her townhouse.

Part 2 (Scenario)
- City home page includes category "For Senior Citizens"
- Goes to senior's page. At top, sees Upcoming Events listing. Can tell from the dates that the list is frequently updated. This makes her feel that it is a lively community.
- Follows link to Senior's Directory. Finds a list of names with email and phone, most with thumbnail images. Recognizes Brett and Joan, an older couple she met last week at church. Makes a mental note to ask them about the community choir, which they both list as a pastime.
- Another link to Calendar shows there is a once-monthly welcome meeting at community center. Uses calendar to send email reminder.
- Nothing about bird watching, but seniors page offers a search box. When she tries "bird watching", she finds a point to a local area club. Decides she will attend the next meeting….

Participant 3
Environment
- Large metro city, e.g., Miami
- This person lives in a senior's building

Person
- Arrived to the city 2 months ago
- Is free of disability, except for low vision
- Is widowed and has no family in town
- Comfortable with basic web navigation.

Situation/Goals
- Wants to find services and resources, specifically: a library with large print books, an aqua fitness class, a lawn bowling club, restaurants that cater to seniors.

Method to Achieve These Goals (the list below is an unordered list of actions)
- Search the city web site for swimming information
- Google with keywords senior + <city name>
- Browse the city site for anything addressed to seniors

Results for Exercise #2 for segment "Writing scenario content"

Participant 4
Happy Story

    Becky, mother of two kids, wants to register them for different courses. She has some experience accessing the city web site. See opens the home page and sees there is a list of text links, including one that says "facilities". She thought that this would contain a list of pools. She opens the page and she sees the expected information….

Sad Story (Error scenario)

    She likes keyword searching. When she accesses the home page of the city web site, she expected that there would be a search mechanism. However, she was not able to find it even though she accessed several pages. She started to think she might call the city office….

Participant 5
Roles
- Mother – Susan; Receptionist – Sid, Younger child – Ann, Older child – Roxy

Context
- Mother: works full time, has internet access at work, works as a manager in a small hotel Monday to Friday.
- Receptionist: works in reception at the local pool
- Younger child – 6 years old, can only swim a short distance, wants to copy her older sister
- Older child – 15 years old, has won school and civic medals for swimming; wants her independence.

Tasks
- Mother: to agree with both children which swimming lessons they will go to; to find details of sessions (cost, time), to book the sessions, to take children to sessions each week
- Receptionist: to check e-bookings, to enter books received by phone, to ensure entitled persons attend sessions, to ensure all persons entering the pool have paid

Scenario

    Susan (mother) decides to phone the local pool on a Saturday to enquire about swimming sessions for her two children, who she wants to go together but to attend different sessions. The receptionist tells her the information she needs is in a leaflet and on the web. Susan decides it would be easier to look on the web on Monday at work. She asks for the URL and writes it down. On her break on Monday, Susan uses her PC to access the URL. She looks for a timetable of sessions, finds one and prints it. She looks for a description of the types of sessions and prints that too. She then notices that there is an on-line booking and payment form, so she prints those too. She saves the URL and logs off….

Participant 6

Mother (as intermediary)	Software System
Browse schedules	Display schedules including whether a course is booked
When appropriate courses found on the same evening, register first child	Store registration
Register the second child	Store registration

Design issue: if the second registration fails, user may need to unregister the first child.

Participant 7

Motivation
- Just moved to new town
- Wants kids to meet others, continue with activity of swimming

Task Specifics
- Wants to find swimming info
- Not sure where to get it
- Aware of city web site and that it might be helpful
- Starts by accessing the site and navigating from there
- …

Other Context
- son is shy and strong swimmer
- mother believes that instructor must be friendly
- daughter is highly social and poor swimmer
- has had a bad experience being left unattended in a previous class
- would appreciate the support of her mother's presence

Potential Errors
- Mother is a novice web user; she has found the web useful but also intimidating
- Using the web because she believes it will get the job done rather than for any natural enthusiasm for the task.