

Scenario-Based Acceptability Research

Hirotsugu Tahira

Haruhiko Urokohara

U'eyes novas Inc. Japan

8th fl. Fujita INZX Building, 9-5,
Shinsen-cho, Shibuya-ku, Tokyo, 150-0045 Japan

tahira@novas.co.jp

urokohara@novas.co.jp

Abstract

We developed a new quantitative research method using a scenario to obtain information on the context of use, and named "Scenario-Based Acceptability Research."

This paper introduces a procedure of this method, how to design an appropriate questionnaire for a test purpose, how to analyze data and evaluate the results, based on our own experience. Various aspects including advantages of this method are also introduced.

1 Introduction

Various attempts to grasp the context of use have done, since analyzing the use of a system by various users has become an essential step to promote a user-centered design approach.

A traditional field observation method, however, takes time and cost. While it is difficult to understand users' perception and behavior from conventional questionnaire method, which may lead results ignored the context.

Taking the importance of context into account, we developed a new method, called "Scenario-Based Acceptability Research," which makes it possible to conduct a research with an easy procedure, guarantees quantitative results, and encourages users to participate the research more positively and easily. This paper considers the effectiveness of this method, based on our own experience.

2 What is Scenario-Based Acceptability Research?

2.1 Overview

The two faces of "Scenario-Based Acceptability Research" are scenario-based design approach and questionnaires with a checklist.

Scenario-based design approach is based on a user interaction scenario, which is a story about people and their activities, using a technology system, in other words, sequences of actions and events to achieve task goals are described. The context from a user's point of view leads to extract problems of the system and design a definite measure to improve it.

Questionnaires with a checklist are based on a checklist that scales the importance of some measures to improve the system. Based on the replies from users, the importance of each measure is quantitatively determined to propose an intensive measure, to consider the propriety of each measure, to grasp the difference among users.

"Scenario-Based Acceptability Research" focuses on a context oriented approach by a scenario and easy calculation of the scaled data by a checklist. Figure 1 is an example of a questionnaire for all-scenario method of "Scenario-Based Acceptability Research." Actions and events are extracted

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家族構成：独身1人暮らし
趣味：サッカー観戦
性別：男
年齢：25歳
所属：某の出勤前、帰宅後
場所：自宅マンション

下線部分についてあなたが当てはまると思うものを選択し○を付けてください。（例）

出動前の予約録画物語

（リリリン♪♪）目覚し時計の音で、耕一は目が覚めた。今日は、朝から仕事のスケジュールがびっしりと詰まっているので、いつもより30分前に出動したいと思っていた。いつものようにまずテレビをつけ、お気に入りの朝のニュース番組を見ながら、身支度を整えていた。

（ニュースキャスター）本日、午後9時に新生ジーコジャパンの初戦である日本対ジャマイカ戦が国立競技場でキックオフ。

（耕一）あ、大事な試合だから、この前買ったDVDレコーダーに録画しなきゃ。ネクタイを締めながら、DVDレコーダーの電源を入れる。

（耕一）あと、10分で家を出たいのに、早く電源付かないかな？ 焦る気持ちを押さえないと、ふと何時から何チャンネルで放送するのか迷う。

（耕一）いっけな。新聞取ってこなきゃ。

と言いながら、マンションの1階にあるポストに覗いて新聞を取りに行った。

（耕一）あ、あ、午後9時から11時までで、フジテレビか。Gコードは1624983で、新聞のテレビ欄を確認しながら、リモコンを使ってGコードを正確に入力した。

（耕一）大事な試合だから、きちんと予約されているかどうか確認したいな？あれ、予約録画画面はどうやるんだけ？

Q1

a. よくある
b. たまにある
c. 一度くらいある
d. まったくない

（耕一）あ、もう時間が無い…。結局、予約確認を途中でやめ、DVDレコーダーの電源をOFFにして家を出た。

それから数時間後、午後9時に耕一は帰宅してきた。

（耕一）やっと仕事が終わったよ。サッカー、サッカー。と、テレビに一目散。しかし、もう開始のホイッスルは鳴っていた。

（耕一）間に合わなかった！ もう始まっている！！

サッカーの試合はきちんと始めから観ないと気が済まない耕一にとってはかなりのショック。明日は朝から早起きで出勤。準備もまだしていない。テレビを一目測した。

（耕一）あーあ、試合終わったら録画したの観初めから見たいけど、遅くなっちゃうよな。かといって何も見ないで出かけるのも辛いし...

Q2

a. よくある
b. たまにある
c. 一度くらいある
d. まったくない

（耕一）しょうがない、今夜、寝不足覚悟で見よう！

耕一は、サッカーの試合が終わるまで、明日の出発の準備をすることにした。

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Figure 1: A questionnaire for all-scenario method

from the scenario with a definite image of a user and a rating scale is set to each action or event to investigate its acceptability.

Test participants who agree with the attributes of the user in the scenario must be screened carefully. Based on the replies from those test participants, acceptability for each action or event is calculated to grasp usability problems, and to lead utility concepts and other various ideas.

2.2 Procedures

2.2.1 Scenario composing

A scenario presupposes a setting where a system is used by an actor in his/her life. The behaviors and thinking of the actor, the appearance and behaviors of the system, and what interactions occur between the actor and the system are described sequentially. The following are tips to make a scenario as rich and realistic as possible:

- Presuppose a setting such as climate, season, time, place, and relationship with other people where the system is used.
- Apart from the purpose of use the system, describe the detailed characteristics of the actor, such as gender, personality, age, family, hobby, and preference.
- Make a story style scenario. The actor's words and thinking should be expressed in natural spoken language.
- Describe the appearance and behaviors of the system in detail.

How well the scenario is composed may impact the replies from the test participants. A scenarist is requested not to compose a scenario based on only his/her experience, but to have a skill to imagine various stories with various kinds of life style. Some systems may require prior

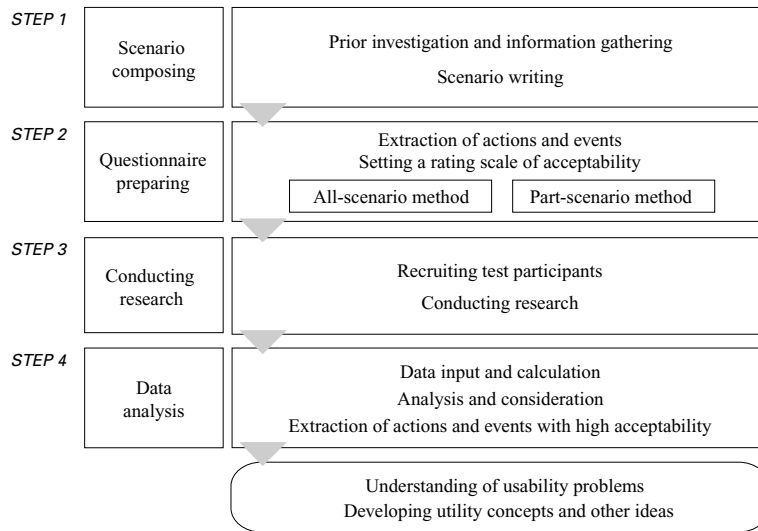


Figure 2: Procedures of "Scenario-Based Acceptability Research"

investigation and information gathering to compose a scenario with good quality. Figure 2 shows the most general procedure of "Scenario-Based Acceptability Research."

2.2.2 Questionnaire preparing

Actions and events involving the actor and the system are extracted from the scenario, which are going to be questions to know about usability problems and utility requirements.

Then a scale is set to evaluate the acceptability of each action or event. Although the number of marks on a rating scale can be anything, 3 to 5 is desirable for test participants to answer the questions intuitively. Figure 1 shows an example of a rating scale with 4 marks: "a. Often" "b. Sometimes" "c. Once or so" and "d. Never"

Either all-scenario method or part-scenario method is selected according to the size and purpose of the research.

As shown in figure 1, the whole scenario is given to test participants and questions are underlined or highlighted somehow in all-scenario method. Test participants can easily understand the story and consider the questions more realistically. However, the length of the scenario and the number of questions need to be carefully considered to avoid a burden on test participants. Based on our experience, the appropriate number of questions to each test participant is less than 8.

Figure 3 shows an example of a scenario used in part-scenario method. Some parts around questions are taken out of the whole scenario to give to test participants. Larger number of questions can be asked compared to all-scenario method, at the sacrifice of the story. To minimize this sacrifice, the questions need to be written with summarization of the story, which requires extra time and effort to compose.


2.2.3 Conducting research

Test participants who agree with the attributes of the user in the scenario must be screened carefully. If not so, proper data of acceptability may not be gathered. Statistical propriety needs to be considered to decide the number of test participants. This is not different from the case with a general questionnaire.

Basically, the research is conducted by distributing the questionnaire to test participants.

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下線部分についてあなたが当てはまると思うものを選択し○を付けてください。(例)

出動前の予約録画物語	Rating Scale
<p>01</p> <p>(耕一)「午後9時から11時、フジテレビか、Gコードは1624983と、リモコンを使ってGコードを正確に入力した。「大事な試合だから、きちんと予約されているかどうか確認したいな?あれ、予約確認画面はどうやるんだっけ?」</p>	<p>1 a. よくある b. たまにある c. 一度くらいある d. まったくない</p>
<p>02</p> <p>(耕一)「やっと仕事が終わったよ、サッカー、サッカー」と、テレビに一目散。しかし、もう開始のプレイスは過ぎていた。「間に合わなかった!もう始まっている!」「あー、試合終わるまで録画したの最初から見たいけど、夜遅くなるよな〜。かといつて何も見ないで明日まで我慢するの辛いし・・・」</p>	<p>1 a. よくある b. たまにある c. 一度くらいある d. まったくない</p>
<p>03</p> <p>ある番組を見ている最中、急に録画して保存しなくなった。 (耕一)「空いているDVD-RAMはどれだ??早く録画確認しなさい!」と、おもむきDVD-RAMをレコーダーに入れた。「さて、どうやって残量を確認するんだ?困ったぞ!」</p>	<p>1 a. よくある b. たまにある c. 一度くらいある d. まったくない</p>
<p>04</p> <p>空き容量のあるDVD-RAMを見つけたものの、ドライブがいつまでも録画待機の状態にならない。 (耕一)「早くしないと保存したい場面が終わってしまう!起動が遅いよ。いつになったら録画になるのかな?」</p>	<p>1 a. よくある b. たまにある c. 一度くらいある d. まったくない</p>
<p>05</p> <p>耕一は先日録画したものを再生してみた。ところが画像が妙に暗い。 (耕一)「あれ?画面が汚いな。何故だ?」と、耕一は録画モードを確認した。するとEPモードで録画されていることに気がついた。 (耕一)「あーあ、慌てていたので録画モードを間違っちゃった」</p>	<p>1 a. よくある b. たまにある c. 一度くらいある d. まったくない</p>
<p>06</p> <p>耕一はDVD-Rを使った予約録画に初挑戦。 (耕一)「失敗したら終わりが分からず、慎重に予約しなきゃ」とGコードで予約。しかし、あまり重要なら覚えていた。 (耕一)「野球中継が延長したらどうしよう。やっぱりDVD-RAMにしようかな」</p>	<p>1 a. よくある b. たまにある c. 一度くらいある d. まったくない</p>

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Figure 3: A questionnaire for part-scenario method

It becomes more effective if it can be done with surroundings that make test participants easily imagine the context of use. For example, when the research is about car appliances used while driving, drivers who are shopping at retail store of car things or who are at a parking area to take a rest become desirable test participants to gather data with the context of use.

2.2.4 Data analysis

The procedure of data analysis is introduced in this section. Any points can be allotted to each mark on a rating scale, apart from the lowest mark 'Never' which should always be allotted 0 point. For example, 3 points to "a. Often", 2 points to "b. Sometimes", 1 point to "c. Once or so", and 0 point to "d. Never".

Equation 1 is to calculate the acceptability. X means the point of selected mark, n means the total number of test participants, and k means the highest allotted point among all marks (3 points of "a. Often" in this example).

$$\text{Acceptability } A (\%) = \frac{\sum X_i}{k \cdot n} \times 100 \text{ ----- (1)}$$

Analysts are to decide a criterion to distinguish questions with high acceptability and low acceptability. For example, assume the analysts decide the case all test participants selected "b. Sometimes" as an important criterion, the calculated acceptability in the case, which is 67 % becomes a borderline as described in figure 4.

Based on the acceptability calculated for all questions, problems and requirements are to be prioritized, and then the questions with high acceptability are mainly focused on to lead solutions of usability problems and suggestions of utility concepts.

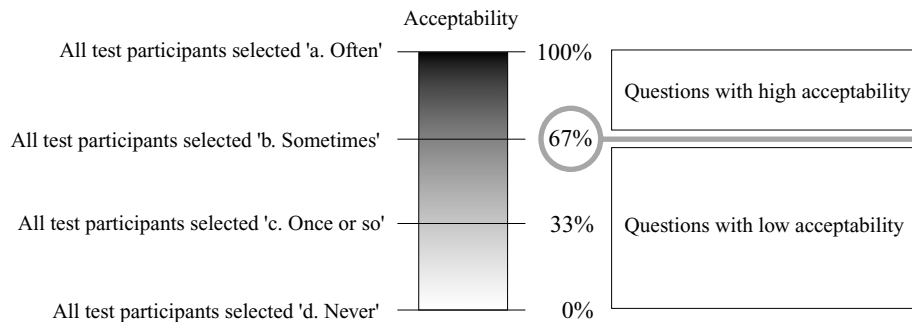


Figure 4: Setting a criterion to distinguish questions with high and low acceptability

3 Conclusion

3.1 Case study with “Scenario-Based Acceptability Research”

We have tried to apply this "Scenario-Based Acceptability Research" to various works as follows:

- Creating a concept model of interior elements, and information and communication appliance for a next generation of cockpit for the US
- Context of use research of car navigation systems
- Creating a concept model of information and communication appliance, and future devices for a next generation of cockpit
- Context of drive – clarifying requirements for development of next generation of information and communication appliance

3.2 Advantages of “Scenario-Based Acceptability Research”

Compared to traditional questionnaires or interviews, "Scenario-Based Acceptability Research" with well-designed questionnaires holds the following advantages:

- A scenario makes test participants empathize the situation and feel as if they are using the system themselves, which brings clearer responses. Based on our experience, test participants address the questionnaire more positively; high response rate can be expected.
- The priority and importance of usability problems and requirements turns to be quantitatively clear and convincing.
- Problems and requirements from a user's point of view can be extracted out of a scenario, which proposes developers to expand their various ideas toward a definite goal.
- Either all-scenario method or part-scenario method can be selected according to the size and purpose of the research. In other words, flexible approach based on the budget, and available time and effort becomes possible.

These characteristics confirm our belief in "Scenario-Based Acceptability Research" as an effective user-centered design tool. We keep verifying various possibilities to apply this method and its effectiveness.

4 References

- Carroll, J.M. (ed.). (1995). Scenario-Based Design Envisioning Work and Technology in System Development. New York: John Wiley & Sons.
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