USABILITY TESTING EXPERIMENT 01

SAMBAD

Access to Computers for Non-literate People

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CHAPTER ONE

INTRODUCTION

The following document is a final report on the usability testing experiment performed at the Godavari Marble Industries by the SAMBAD (Access to Computers for Non-literate People) Team, from march 30, 2006 to may 5,2006.

1.1 Background of the Study:

The concept, of non-literate people using sophisticated computer-based content authoring systems, is as yet an unexplored or sparsely explored territory in Human Computer Interaction. So, it is crucial that we conduct experiments to determine the exact form of interaction modes suitable in such cases.

We performed a usability testing program to find out which input devices do the users feel most comfortable with to interact with the computer. We studied what type of computer application programs will be appropriate in the context of people who cannot comprehend the written text.

1.3. Objectives

The main objective of the usability testing program was to find out the most preferred input device among mouse, touchscreen, keyboard (traditional/customized) among the non literate people to interact with the prototype application. Beside this we had some specific objectives as follows:

- To test whether the participants would be able to begin using the application without the pre requisition of ability to read and write.
- To examine participant’s ability to traverse from one screen to another predetermined by the voice instruction.
- To examine whether or not do the participants feel that the pictures, colors, voices used on the user interface are self explanatory?

- To examine whether or not do the participants feel comfortable using only speech instruction played in the background of the application?

1.4 Prototype Description:

The prototype software developed for the usability testing was made in java. It allows the user to record his/her story, listen to the stories recorded by other users and rate them. The user interface in the software was specially designed keeping in view of the inability of the target users to read and write. We replaced the traditional textual user interface with the graphical and audio interface. The user interface contained large self explanatory pictorial signs and icons, and speech instructions assisted the users to understand the interface. The software was a prototype design on how future software product of the research would look like.

CHAPTER TWO

METHODOLOGY

2.1 Rationale behind the Usability Testing:

The term usability is used to denote the ease with which people can employ a particular tool or other human-made object in order to accomplish a particular goal. Usability testing generally has the following characteristics (Dumas and Redish 22):

1. The primary goal is to improve the usability of product. For each test, there must be specific goals and concerns that you articulate when planning the test.
2. The participants represent real users.
3. The participants do real tasks.
4. The team observes and records what participants do or say.

5. The team analyzes the data, diagnoses the problems, and recommends changes to fix these problems.

Although these characteristics describe a standard approach to usability testing, it is important to recognize that the term usability testing can mean different things to different people, depending on their training and experience.

In our scenario, the usability testing was to study the preference in the input devices by the real users (non-literate people). The study revealed on which device we should focus on the software for the non-literate people. The results of the study gave suggestions to the researchers, on the design issues of the human computer interface to be used. The study also revealed the further topics on which study has yet to be done for the further development of the project.

2.2 Research Design:

Mostly experimental research design was applied to the conventional usability testing. However the present study followed semi experimental research design. It made an attempt to describe and collect the necessary data to evaluate the non literate people's performances in human computer interaction.

2.3 Nature and the Sources of the Data:

The data collected were both qualitative and quantitative in nature**.** This study included both primary and secondary sources of information. **Primary data** for the present study were collected from empirical evaluation process through participant greeting and background interviews, performance evaluation with participant observations, automated user logs, participants debriefing and Focus Group Discussions while the **secondary data** were obtained from different sources like internet, publications and expert opinions etc. The reason for us to gather the data from both the sources was to ensure reliability of the results of the study.

2.4 Participants sampling:

The 300 non-literate or semi-literate labor employees of the factory were the ideal test subjects of our study. 36 participants out of the pool of 300 were taken by simple random sampling method to generalize the sample size. While selecting the participants, the quota for selection of the male and female was made equal.

2.5 Data Collection Techniques:

The data collection techniques for the present study were divided as Primary and Secondary data collection techniques. Primary data was collected through semi-structured interviews, Focus Group Discussions and participant observation. The secondary information obtained were from other sources, in particular expert opinion, internet, related publications etc.

Primary Data Collection:

Background interview

We personally greeted each participant to make them feel comfortable during the experiment session. We interviewed the participants informally rather than a more formal one. We explained them that their confidentiality will be kept and asked them not to offend others. The information gathered during the interviews was useful for the evaluation of their experiment sessions.

Performance evaluation

The performance evaluation consisted of a series of tasks that were evaluated separately and sequentially. The individual participants completed the tasks while being recorded on video and observed by the usability testing team. The scenario was as follows:

- After the orientation, we asked the participants to hear the speech instruction played in the background of the experiment prototype application.
- After the participants begin working through the evaluation scenario, we encouraged them to work without guidance except for the speech instruction itself. We instructed them to ask us if there was any difficulty after hearing the instruction and seeing the user interface.

We observed each of the participants while performing the experiment and prepared a report on the evaluation of their performance filling up an evaluation form. Later we analyzed the evaluation form and graded the participants according to it.

User logs

There were various methods used to log the participant's performance, namely user log feature in the application prototype, software to record each participant's activity (hyper cam), and video recording of the participant using user input device and performing the experiment.

By analyzing one of the various logs kept during the experiment we could find the time taken by each participant to complete the predetermined tasks, the number of retries and problem faced in great detail, etc. We prepared a script to read and analyze the log file kept by the experiment software.

Participant debriefing

After completion of the experiment session we debriefed each participant to find out the following:

- Participant's opinions on the software's usability, appearance of application screens, and general impressions of the software
- Participant's overall comments about his or her experience
- Difficulties that the participant faced during the experiment

Focus groups

We arranged a discussion group moderating responses from the participants to find out what kind of application do they find useful, their interest in computers and information technology. We also tried to figure out what kind of application programs will be suitable and useful for the use of the non-literate people.

2. Secondary Data Collection Techniques:

We asked various experts for their opinions on our experiment prototype and the experiment itself. We referred to published literature from various experts to collect data from the experiments performed by other researchers in the related field. We used published resources from the web, books, research papers and journals on the similar field. The list of the resources is given in the refereces in detail.

2.6 Reliability and Validity of Data:

Relevant primary data were pre-tested, cross-checked and verified in the field. The methodology applied included participant observation, debriefing, focus group discussion with male and female participants. The main tools used in the field were semi-structured interviews and field observations. The researchers themselves were involved in the data collection.

2.7 Operational Definition of Selected Concepts/Variables

Usability: "How easy an interface design is to understand and use. A user-friendly document will let the user read or play any content at will; it will have unambiguous interactive controls and a clear navigational scheme." (from Lisa Graham, The Principles of Interactive Design, 1999)

Webpages: A file of information made available for viewing on the web and seen by the user as a page of information on the screen.

Literacy: Literacy is the ability to read and write. In modern context, the word means reading and writing in a level adequate for written communication and generally a level that enables one to successfully function at certain levels of a society.

Non-literates: Non-literate literally means not able to read and write. In modern context, the term refers reading and writing in a level adequate for written communication and generally a level that enables one to successfully function at certain levels of a society.

HCI: Human-computer interaction (HCI) is the study of interaction between people (users) and computers. It is an interdisciplinary subject, relating computer science with many other fields of study and research. Interaction between users and computers occurs at the user interface (or simply interface), which includes both hardware (i.e. peripherals and other hardware) and software (for example determining which, and how, information is presented to the user on a screen).

TTS: Text to speech (TTS) is the process of producing the speech equivalent of text. Text-to-speech technology allows an alternate spoken method for conveying textual information.

UI: User Interface (UI)the components of a computer system that the operator uses to interact with the computer - the screen display, keyboard, mouse, touch controls, etc.

2.8 Flexibility of the Study:

The usability testing experiment was made flexible in terms of time, number of the participants and installment of the testing laboratory. Also the use of various session recording tools like video camera, webcams, manual as well as automated log writing were made flexible according to the availability of the equipments, man power and resource.

2.8.1 Duration of the Test

We performed the usability testing experiment for 5 days successfully. Though we had planned to do it for 6 days, we had to finish the experiment within 5 days due to the ongoing strikes during the scheduled experiment days. The details of the experiment session time table is given in the appendix.

2.8.2 Scenarios of the Test

The laboratory setup was an informal setup rather than a formal usability testing lab equipped with advanced equipments and gadgets. We performed a supervised usability testing to the users rather than allowing them to interact with the software along.

This was mainly because the users were non literate, they had had no experience interacting with the computer and the laboratory had no one sided glass for us to continuously monitor the users from another room. The outside noisy environment of the factory created some problems while recording the experiment session.

CHAPTER THREE
INTRODUCTION OF THE STUDY AREA AND CHARACTERISTICS OF THE PARTICIPANTS

3.1 Introduction of the Study Area:

Godavari is a beautiful village 13Km far form the MPP. It lies in the SE of the Kathmandu Valley. Godawari is an ideal place for carrying out our experiment because of the following reasons:

1. Security Reasons
2. Institutional Support
3. Cultural Background
4. Natural Environment
5. Methodological Reasons
6. Applicability

Godawari Marble Industries is the only marble factory of Nepal which occupies 30% of the Nepali market. Above 400 people are employed in the factory benefiting at least 2000 people directly or indirectly. More than 300 labor staffs who work in the factory could be the ideal test cases for our experiment.

1. Security Reasons: The factory premise is well guarded.
2. Time Availability: After 3PM of the working day.
3. Institutional Support: Godawari Marble Industries showed a good interest for the experiment. They showed their will to provide staffs working time for our

experiment after 3PM. They agreed to give assistance by providing space and computers for the training purposes once approached formally to their top level management.

4. Cultural Background: Mostly labor employees from Tamang ethnic group work in the factory numbering to 300. Tamangs are easy to deal with looking at their nature and speaking styles.
5. Natural Environment: Factory premises could be the natural environment for the people who work there for our experiment. As the management has agreed to let them participate at working hours (after 3 pm), it would be natural time to work for the participants.
6. Methodological Reasons: There are possibilities to categorize the people, age groups, ethnicity, gender etc in our study. It will also be possible to control the variables that affect human behavior.
7. Applicability: However the participants of the factory are functionally illiterate they have willingness to get support from modern technologies. After the completion of the experiment they will hold confidence to run computers and benefits to their daily life.

Because of the reasons mentioned above we arranged usability testing experiment program in the premises of Godavari Marble Industries. The laboratory was set within the factory premises where the non-literate staffs, taken as participants, spent their daily life of work. We carried out the experiments for 5 working days with 36 partcipants.

3.2 Characteristics of the Participants:

As mentioned above most of the participants came from a Tamang ethnic group, fewer were from ethnic groups like Tharu, Rai, Magar, Madhesi etc. Most of them were from Hindu regilious background while some were Buddhists. More than 50 % of the participants knew how to write their names and count numbers but they couldn't comprehend the written text. Rests of them were totally non-literate. If given a chance most of them are willing to learn how to read and write. All the participants came from the families whose economic status is below the poverty line.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

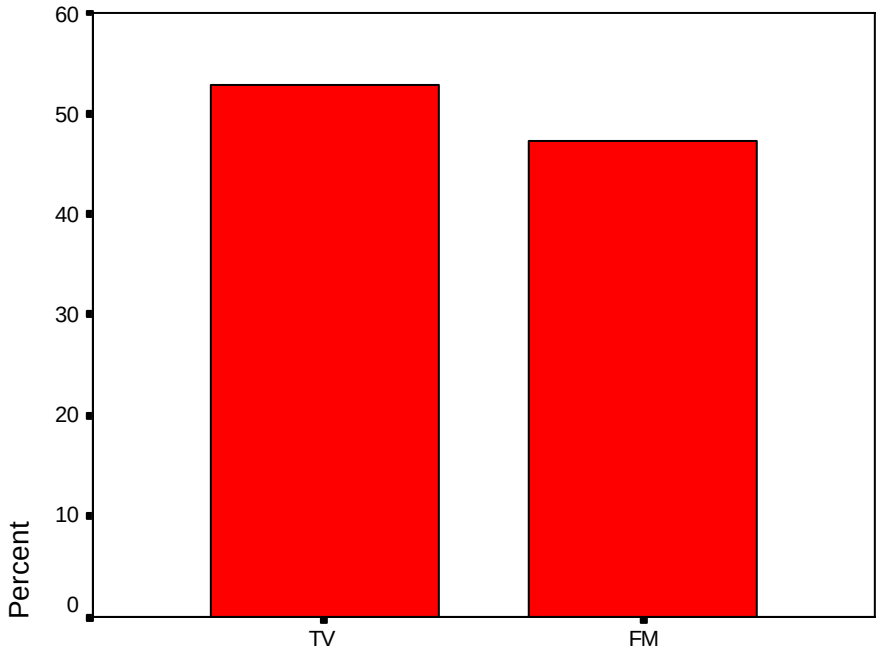
Age Distribution of Participants

We focused on the participants ranging from age 15 to 50 who were non literate or semi literate. The average age of the participants was 30 for male and female, the most productive age to any kind of job.

Sex	Mean	N	Std. Deviation
Male	30.92	13	11.21
female	29.96	23	9.06
Total	**30.31**	**36**	**9.74**

Favorite Media of the Participants

We asked all the participants about their favorite media apart from computer. On which most of them preferred television and F.M radios.



Mood of Participants

We observed the participants via brief conversation before, during and after the experiment to find their mood. We also observed their facial expressions and body language. Finding their mood was important because, it could reveal the effectiveness of the experiment. The results of the observation showed that even though some of them were a bit nervous before using the computers, all of them were happy to be able to use a computer after the experiment.