Software Engineering Project

Usability Evaluation Plan

Smart-glass based
Remote Guidance System

Table 1. Document Change Control

Version	Date	Authors	Summary of Changes
1.00	20/05/2018	Dineth Gunawardena	Initial Draft
1.10	21/05/2018	Dineth Gunawardena	Made changes to the Executive Summary
1.20	22/05/2018	Dineth Gunawardena	Made changes to the Usability Tasks section based on Software Requirements Specification
1.30	23/05/2018	Dineth Gunawardena	Made Changes to the "Training" and "Procedure" sections based on the Usability Evaluation Tasks document
1.31	24/05/2018	Krishna Adhikari	Formatted the document as per the standard to make it ready for the portfolio submission
1.32	26/09/2018	Dineth Gunawardena	Made changes to the Procedure, Usability Tasks, Usability Metrics, Usability Goals, and Reporting Results sections

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1.) Executive Summary

Usability evaluations are a significant process to be completed in achieving the best possible prototype. A prototype can match the requirement specifications collected from the client but might not always meet the expectations of the end-user. There can be certain non-functional requirements that can only be gathered by validating the prototype with a user. The prototype must be tested with participants of the target demographic who will wind up using the product in the workplace. Demographic questionnaires can help identify the target user group. Usability metrics like scenario completion rate, error rate, subject evaluations and time taken on tasks must be gathered to help identify potential issues in the system. Recommendations to resolve these issues are included in the usability test report to conclude the usability evaluation.

2.) Methodology

The factors mentioned below must be achieved to ensure a successful usability test.

- **Number of participants-**
  A healthy number of participants would be needed to collect sufficient data to create the best possible interface. A minimum of 4 participants would be needed for this experiment.
- **Environment-**
  The evaluation would take place in a group study room in the library, where it wouldn't Be likely for the evaluation to be interrupted or disturbed.
- **Measures-**
  Completion rate, error rate and subjective evaluations would be used as metrics to measure user performance to evaluate the application.
- **Demographic Information-**
  A demographic questionnaire would be handed over to the participant right before the test to ensure that the participant belongs to the target user group that would use the product
- **Satisfaction Assessment-**
  After the experiment, the participant would be handed a satisfaction questionnaire where they would inform us about what problems they found with the interface and the suggestions they have to fix these problems.

3) Participants

The end user of the Vuzix Smart Glass would be an employee or trainee working with an instructor in a training program. Apart from basic experience with technology , the participant would not be expected to have any additional technology skills.

Participants have the responsibility to complete tasks given to them while giving feedback by talking about their thought process while doing the task. Participants are also asked to complete a demographic questionnaire pre evaluation, and satisfaction questionnaire post evaluation. The experiment would be a simulation of a real life training scenario, therefore the participants would be students imitating the role of the operator and instructor.

4) Training

The participant will be given a brief overview of how the Vuzix Smart Glass works,where the buttons are located and hand gestures to trigger functions as the participant might not have any prior experience using the product.

5) Procedure

Before the experiment, the participant is briefed on the how the experiment will be conducted with a short training session to introduce them to the hand gestures needed to trigger certain functions. Informed consent would inform the participant that they can leave at any time, how they will be recorded while keeping their identity protected.

The participant will fill out a demographic questionnaire before the test, a post-task questionnaire after completing each task and a post-test satisfaction questionnaire. To get a verbal record which could be reviewed, the participant would be asked to read the task aloud and think aloud while doing the task. A team member would be making notes on the evaluation while the participant is being tested.

6) Roles

Members of the team will be assigned roles that they must carry out during the experiment.
- **Trainer-**
Gives the participant a brief training session before the test.
- **Facilitator-**
Briefs the participant on how the test will be conducted and will be available to respond to the participant's requests.
- **Test Observer-**
Logs down participant feedback, while analyzing application issues.

7) Usability Tasks

The tasks are common tasks which every end user would expect to do while using the application. The tasks aren't same for each participant with some playing the role of the operator, while others play the role of the instructor, and would be given different tasks accordingly.

Usability tasks would be testing three features of the smart glasses based on the operation of taking a screenshot, making a sketch on the screenshot and switching between instructor and operator. It is essential that these features are expected to not only
work, but be easy to use, as it is expected of the users to use these features frequently.
 All of the tasks in the tests would be significant which end users of the application must not find any issues with. The task descriptions will be reviewed by the project supervisor, and client. Their acceptance would be documented.

8) Usability Metrics

Usability requirements can be evaluated using usability metrics like scenario completion rates, error rates, subject evaluations and time of completion will be used to calculate usability performance on tasks.

8.1) Scenario Completion-

A scenario is completed when the user has gotten the expected output or when the user requests assistance and cannot complete the task due to usability issues.

8.2) Error Rate-

There are two types of errors being critical and non-critical errors. Critical errors are those of which prevent the user from getting the expected output and non-critical errors are errors which the user is able to recover from but could potentially give an unexpected outcome.
Non-critical errors can be measured by the number of assists needed per participant as a participant would require assistance when they encounter a problem.

8.3) Subjective Evaluations-

The post-test satisfaction questionnaire is scaled against a system usability score and can be used as a metric to measure a user's satisfaction with the system.

8.4) Time on Task-

The average time a user takes to complete each task.

9) Usability Goals

The usability goals for this usability evaluation would be a completion rate of 100% and an error frequency of 2 or less for the entire evaluation. The completion rate is the percentage of participants who successfully complete the task without critical errors. The error-free rate is the percentage of participants who complete the task without both critical and non-critical errors.

10) Problem Severity

Problems that are seen during the testing must be classified under severity which is dependent on impact and frequency.

10.1) Impact ranking-

- · **High**- A critical error which prevents the user from completing the task
- · **Moderate**- A non-critical error which causes the user to have a larger time on task despite the task being completed
- · **Low**- A user encounters a minor non-critical error

10.2) Frequency ranking-

- · **High-** Greater than 30% of the participants encountered the issue
- · **Moderate-** 13%-29% of the participants encountered the issue
- · **Low-** Less than 13% of the participants encountered the issue

10.3) Severity Ranking-

- ● **Severity 1-** An issue with high severity and high impact preventing the user from completing the task. This kind of issue must be fixed as quickly as possible.
- ● **Severity 2-** An issue with moderate to high frequency with moderate impact which doesn't allow the user to complete the task efficiently.
- ● **Severity 3-** An issue with either moderate frequency with low impact or low frequency with moderate impact that might frustrate some users.
- ● **Severity 4 –** An issue with low frequency and low impact that might increase user satisfaction if the problem is to be resolved.

11) Reporting Results

The results of the usability evaluation will be recorded on an observation sheet with the outcomes being analysed against a requirements rubrik. The usability evaluation test will then be concluded with a usability test report that will present the results with the usability metrics compared with the usability goals and recommendations resolve the problems.