Verification and Validation Report: Software Engineering

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1 Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

2 Symbols, Abbreviations and Acronyms

symbol	description
T	Test

[symbols, abbreviations or acronyms – you can reference the SRS tables if needed —SS]

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3 Functional Requirements Evaluation

3.1 Database Testing

The following section presents the results of the our database testing

Table 1: **Functional Requirements Evaluation Results for Database Testing**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-DB1	Automated	Periodic backup run is completed.	Automated monitor verifies that the database backup is present and correct.	Same as expected	Pass
Test-DB2	Automated	Command to check encryption status is inputted into DBMS for all databases	DBMS response shows that all databases are encrypted	Same as expected	Pass

3.2 Custom AR Object Generation

The following section presents the results of our custom AR object generation testing.

Table 2: **Functional Requirements Evaluation Results for Custom AR Object Generation**

Id	Control	Inputs	Expected Result	Actual Result	Result
Test-POG1	Automatic	Enter prompts of various lengths, with and without profanity.	Prompt is restricted to 200 characters, real-time character count is displayed, profanity is flagged and rejected.	Same as expected	Pass
Test-POG5	Manual	Rotate the AR object to inspect all sides.	The AR object rotates smoothly, allowing inspection from all angles.	Same as expected	Pass

3.3 Uploading Objects to Inventory, Post Object Scan

The following section presents the results of our testing for uploading objects to inventory after scanning.

Table 3: **Functional Requirements Evaluation Results for Uploading Objects to Inventory**

Id	Control	Inputs	Expected Result	Actual Result	Result
Test-OUI1	Manual	Display the scanned object and allow for user interaction in editing mode.	Render of scanned object is displayed, user can edit and finalize the object.	Same as expected	Pass
Test-OUI2	Manual	Provide a name for the object and save it with metadata.	Object name is stored (ASCII only), and all metadata is correctly saved.	Same as expected	Pass
Test-OUI3	Manual	Select specific portions of the object and apply color changes.	Color changes are applied accurately and reflected in the final render.	Same as expected	Pass

4 Nonfunctional Requirements Evaluation

4.1 Usability Testing

The following section presents the results of our usability testing.

Table 4: **Usability Testing Evaluation Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-QS-U1	Manual	Language setting is changed to English, Mandarin, Hindi, Spanish, and French.	Text updates correctly in all tested languages with understandable translations.	Same as expected	Pass
Test-QS-U2	Manual	New users perform core app workflows without guidance.	80% of testers complete tasks and rate the app as intuitive and satisfying.	Same as expected	Pass

4.2 Security Testing

The following section presents the results of our security testing.

Table 5: **Security Testing Evaluation Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-QS-SC3	Manual	Code sections displaying private data are checked for identity verification.	All sections contain identity verification checks.	Same as expected	Pass

4.3 Availability Testing

The following section presents the results of our availability testing.

Table 6: **Availability Testing Evaluation Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-QS-A1	Automated	Monitor server uptime over one week.	Server uptime recorded at 99% or higher.	Same as expected	Pass

4.4 Performance

4.5 etc.

5 Comparison to Existing Implementation

This section will not be appropriate for every project.

6 Unit Testing

This section provides the test reports for the unit tests performed on various modules of the system.

6.1 Settings Module Testing

The following section presents the results of our Settings Module testing. The tests verify that the settings module correctly validates input keys and ensures profile details match the expected schema.

Table 7: **Settings Module Unit Test Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-SM1	Functional, Automated	Valid and invalid settings keys	Returns true for valid key, false for invalid key	Same as expected	Pass
Test-SM2	Functional, Automated	Valid user settings object	Returns object matching expected schema	Same as expected	Pass

6.2 Help Module Testing

The following section presents the results of our Help Module testing. The test verifies that the search functionality correctly returns relevant help items when given partial and full keywords.

Table 8: **Help Module Unit Test Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-HM1	Functional, Automated	Partial and full keywords matching help items	Outputs match expected search results	Same as expected	Pass

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6.3 Collision Detection Module Testing

The following section presents the results of our Collision Detection Module testing. The test ensures that the module correctly identifies potential collisions based on AR tracking and accelerometer data.

Table 9: **Collision Detection Module Unit Test Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-CD1	Functional, Automated	Mock AR tracking and accelerometer data	Returns true for collisions, false otherwise	Same as expected	Pass

6.4 Tour Proximity Module Testing

The following section presents the results of our Tour Proximity Module testing. The test ensures that the module correctly detects and returns a list of nearby tours based on GPS data.

Table 10: **Tour Proximity Module Unit Test Results**

Id	Type	Inputs	Expected Result	Actual Result	Result
Test-TP1	Functional, Automated	Mock GPS data for device and tours	Outputs list of tours within specified distance	Same as expected	Pass

7 Changes Due to Testing

[This section should highlight how feedback from the users and from the supervisor (when one exists) shaped the final product. In particular the feedback from the Rev 0 demo to the supervisor (or to potential users) should be highlighted. —SS]

8 Automated Testing

9 Trace to Requirements

10 Trace to Modules

11 Code Coverage Metrics

References

Appendix — Usability Survey Results

Link to view survey: here

Table 11 below showing the results of the Usability survey

Table 11: **Results of Usability Survey**

Statement	Average Rating of Statement Accuracy / 5	Analysis
Navigation between interfaces is intuitive	3.833	Most users found the navigation to be intuitive, although navigation seems to be the lowest rated aspect of the functional user experience
Placing objects is easy	3.917	No ratings below a three and an average rating of "Agree" says that this was well recieved
Generating objects is easy	3.917	Again, no ratings below a three and an average rating of "Agree" indicates that the design works for most users
It is easy to start a tour	4.167	A good indication that the touring experience was designed well
Changing settings is easy	4.417	Somewhat expected, users generally did not have issues finding and changing settings as it was a straightforward feature
The app is generally satisfying to use	3.667	This was the lowest rating of all our positive statements. We recieved relevant feedback on the non-uniform look and feel of the app making the app feel like a rushed development
Using the app distracts from the surroundings	3.167	More found the app distracting than not, but the results are somewhat inconclusive given the variance

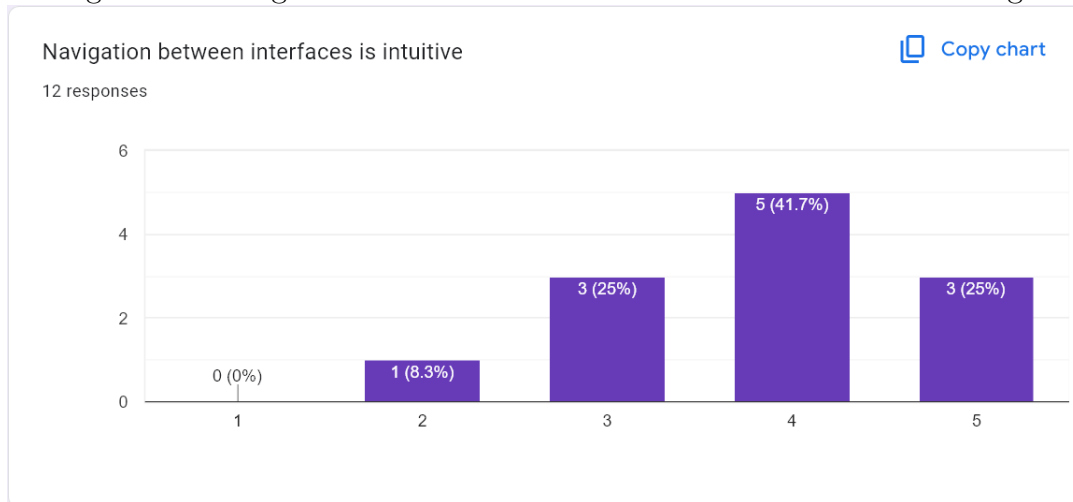Figure 1: "Navigation between interfaces is intuitive" statement ratings

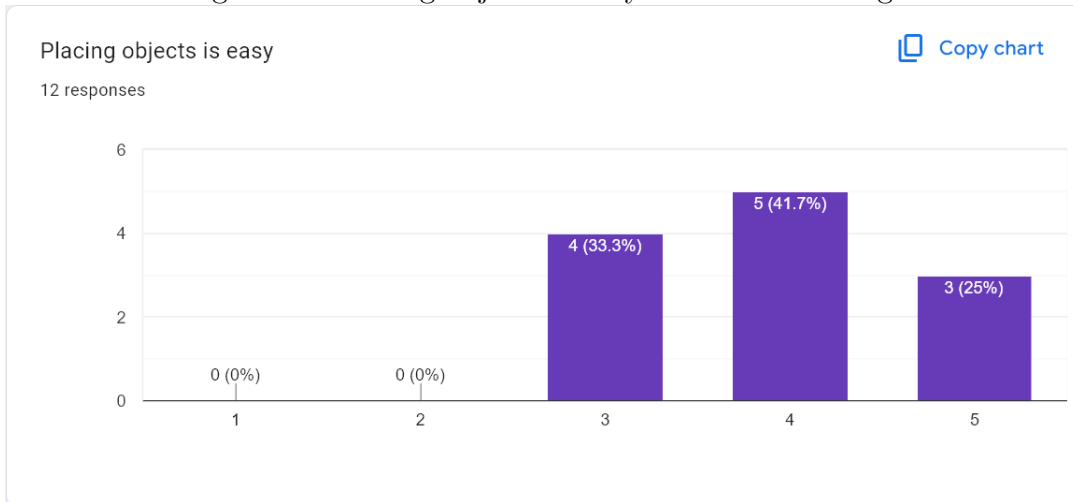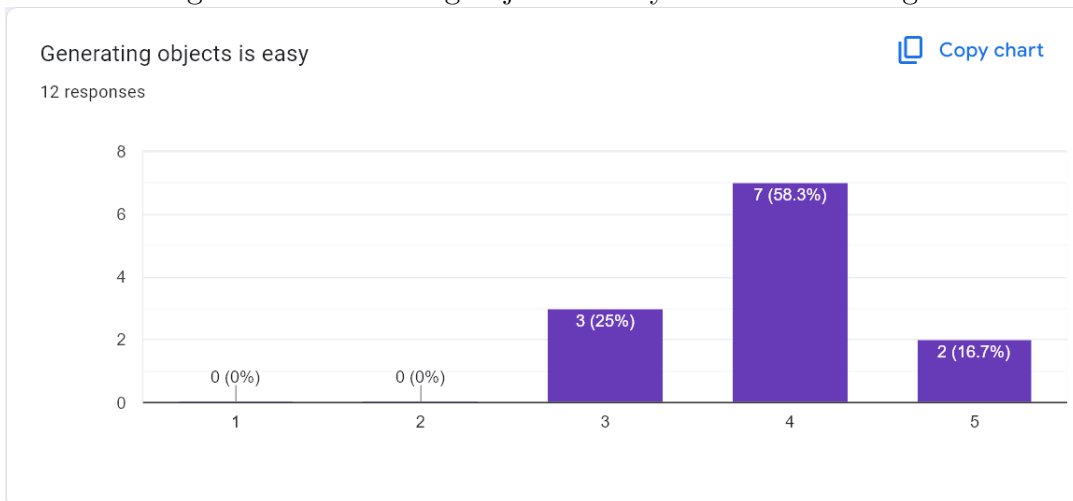Figure 2: "Placing objects is easy" statement ratings

Placing objects is easy

Copy chart

12 responses

Figure 3: "Generating objects is easy" statement ratings

Generating objects is easy

Copy chart

12 responses
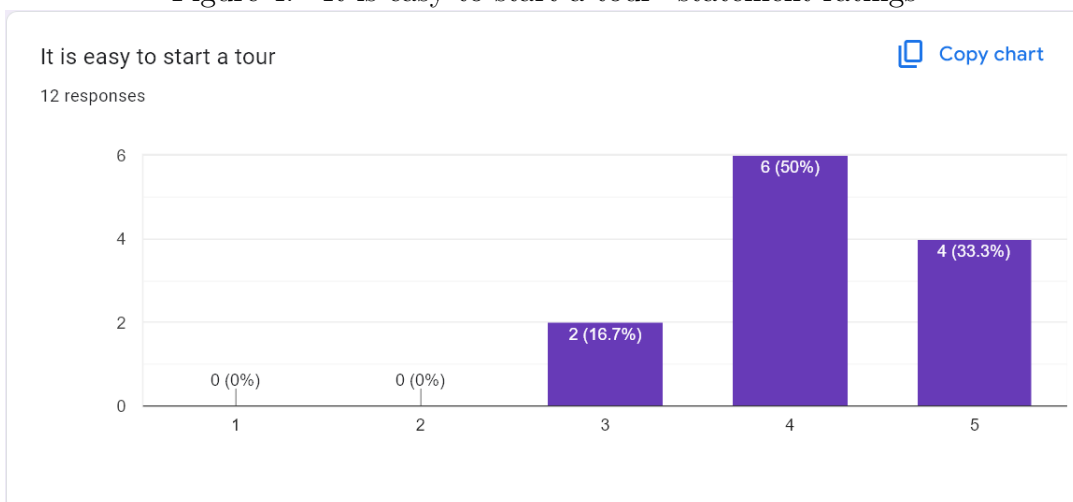
Figure 4: "It is easy to start a tour" statement ratings

It is easy to start a tour

Copy chart

12 responses

Figure 5: "Changing settings is easy" statement ratings

Changing settings is easy

12 responses

Figure 6: "The app is generally satisfying to use" statement ratings
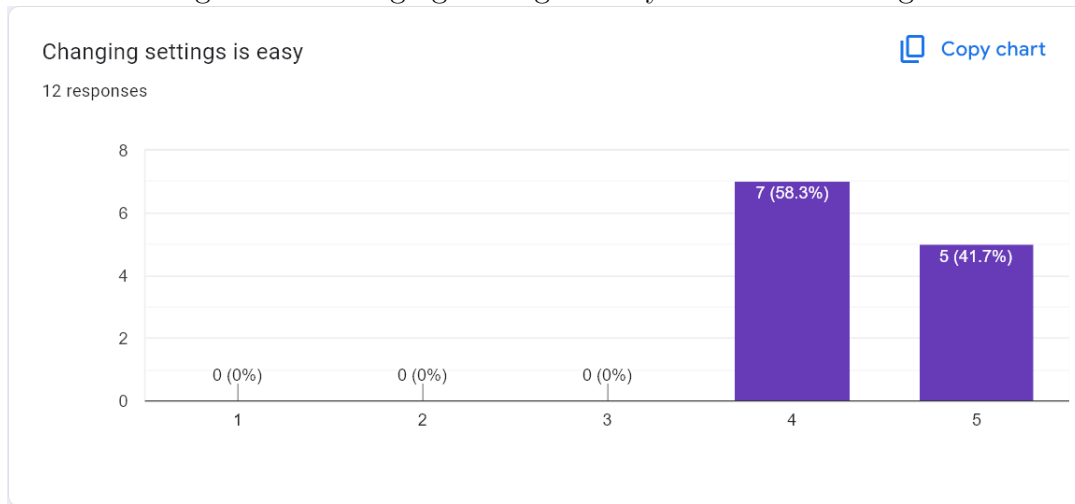
The app is generally satisfying to use

12 responses

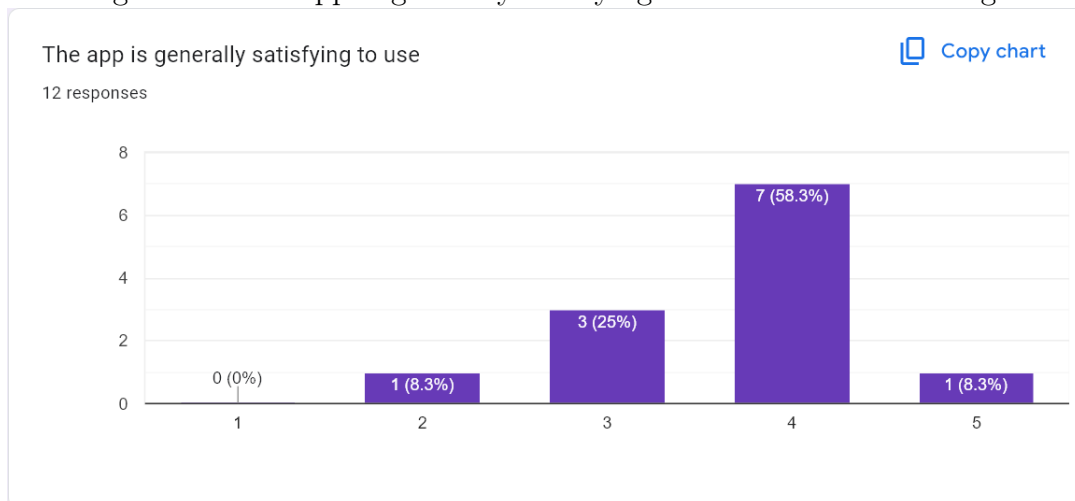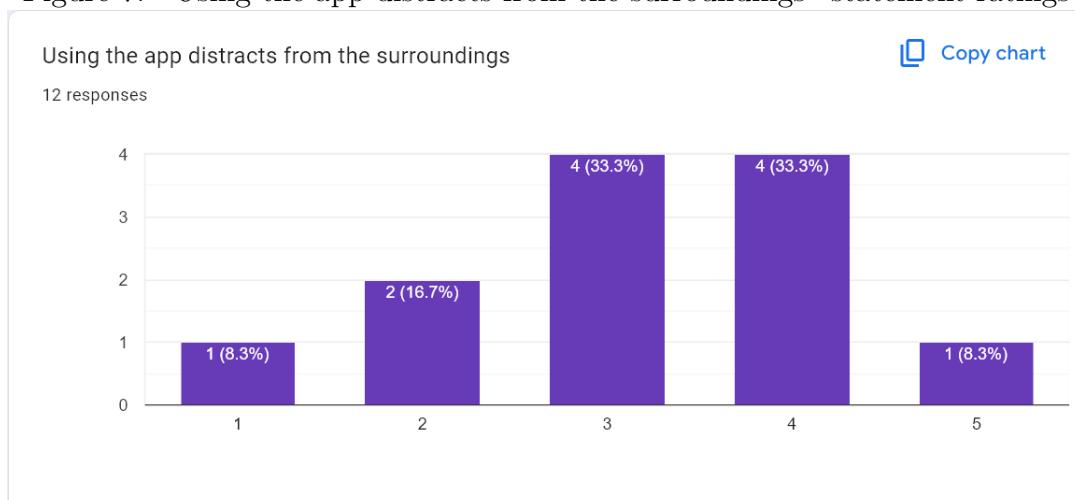Figure 7: "Using the app distracts from the surroundings" statement ratings

Using the app distracts from the surroundings

12 responses

Appendix — Reflection

The information in this section will be used to evaluate the team members on the graduate attribute of Reflection.

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?

2. What pain points did you experience during this deliverable, and how did you resolve them?

3. Which parts of this document stemmed from speaking to your client(s) or a proxy (e.g. your peers)? Which ones were not, and why?

4. In what ways was the Verification and Validation (VnV) Plan different from the activities that were actually conducted for VnV? If there were differences, what changes required the modification in the plan? Why did these changes occur? Would you be able to anticipate these changes in future projects? If there weren't any differences, how was your team able to clearly predict a feasible amount of effort and the right tasks needed to build the evidence that demonstrates the required quality? (It is expected that most teams will have had to deviate from their original VnV Plan.)