# Part 3.2 System Prototype

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Human Computer Interaction

CS152

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# I. Project Description

In the Philippines, many individuals who own valuable items, such as jewelry or electronics, often face significant challenges in determining the authenticity and value of their possessions. Additionally, they struggle to find suitable pawnshops that will offer the best price for their items. With the Philippines Jewelry market projected to reach US$1.07 billion by 2024 (Statista, 2024), and approximately 17,421 pawnshops operating in the country, each entertaining around 300 customers per day, there is a pressing need for strategic decision-making and advanced technology (Borres, 2020).

Pawnquest is an application that aims to resonate with the hearts of serviceable obtainable Filipinos of around 1.9M in our first year by providing a service such as an appraisal of jewelry and electronics, a fake detection mechanism to determine the authenticity of an object by 3D capturing the item and if device uploads its software details in the cloud to be determined by our model. It also aims to provide a pawnshop locator near you that makes an offer for an item, subsequently being able to message them and exchange another type of media.

Additionally, the app facilitates direct communication with pawnshops through a built-in messaging feature, enhancing the user experience and enabling real-time discussions. It also maintains a list of all transactions made by the user, providing a clear record of items pawned, prices, dates, and pawnshops involved. To ensure the integrity of transactions, the application implements a verification system for both ends - the user and the pawnshop. Once a transaction is successful, both parties should confirm it in the app. This feature helps prevent disputes and enhances trust in the platform.

# II. Requirements Summary

| | | iOS | Android |
|---|---|---|---|
| Minimum Requirements | Processor Cores | Dual-core (2 cores) | Quad-core (4 cores) |
| | OS | iOS 12 or later | Android 8.0 (Oreo) or later |
| | RAM | 2 GB | 3 GB |
| Recommended Requirements | Processor Cores | Quad-core (4 cores) | Octa-core (8 cores) |
| | OS | iOS 14 or later | Android 10.0 (Q) or later |
| | RAM | 4 GB | 6 GB |
| | Item Appraisal | Camera Access | Camera Access |

| | | | |
|---|---|---|---|
| Other Requirements | Pawnshop Navigation | GPS Access | GPS Access |
| | Messaging and Video Calls | Internet connectivity, Microphone & storage | Internet connectivity, Microphone & storage |

*Table 1: System Requirements*

To ensure seamless navigation for users, as seen in Table 1 PawnQuest for iOS requires at least a dual-core processor, iOS 12 or later, and 2 GB of RAM, with better performance on a quad-core processor, iOS 14 or later, and 4 GB of RAM. On Android, the minimum requirements are a quad-core processor, Android 8.0 (Oreo) or later, and 3 GB of RAM, with the recommended setup being an octa-core processor, Android 10.0 (Q) or later, and 6 GB of RAM. The app uses the device's camera for item appraisal, GPS for finding nearby pawnshops, internet, microphone, and storage for messaging and video calls. These capabilities enable features like 3D capture for accurate item pricing, cloud-based detection of counterfeit items, and seamless communication with pawnshops.

## III. Overview

To reach a wider range of audience, the team would communicate physically at Mapúa Malayan Colleges Mindanao or online using Microsoft Teams, Discord, and Google Forms for evaluation. This hybrid approach is done to efficiently cater to a larger audience while seeing a live feed of the prototype and responses.

The evaluation is split into three separate parts: System Usability, Heuristics Evaluation, and Participant Survey and Feedback.

| Technique | Description |
|---|---|
| System Usability Scale | System Usability Scale (SUS) is a questionnaire that is used to evaluate the usability of products and services. The questions from this survey are used as a quantitative method to evaluate and get valuable insights into a system. The users are tasked to answer 10 questions with a formula to be used. |
| Heuristics Evaluation | Heuristics Evaluation aims to identify design problems in a user interface. It will help developers measure the usability of user interfaces in independent walkthroughs and report issues and reveal insights that can help the developers enhance product usability. |
| Participant Survey and Feedback | A survey will be given to participants after successful prototype usage. The survey will contain qualitative |

| | |
|---|---|
| | questions in the form of feedback. To ensure no biases will be made in the evaluation. |

*Table 1: Data Gathering Methods*

The tasks for this Prototype are split into different sections: account registration and details task, menu and dashboard task, and appraisal and messaging task. Below are the tasks the participants will partake in performing to showcase the prototype's functionality:

- Account Registration **(Account registration and details task)**
- Logging in and out **(Account registration and details task)**
- Exploring the main menu from the dashboard and exploring its functionalities **(Menu and dashboard task)**
- Object appraisal **(Appraisal and messaging task)**
- Pawnshop locator **(Appraisal and messaging task)**
- Pawnshop listing and messaging **(Appraisal and messaging task)**
- How easy the users will be able to navigate the prototype

# IV. Data Presentation

## IV.I Data Presentation and Analysis

### IV.I.I System Usability Scale

During the mixed evaluation of online and physical with the participants, the users were able to grasp the flow of navigation easily with almost all of them being able to accomplish the task at ease. However, some icons or buttons were unresponsive which puzzled the user for a moment, however, they ultimately reached their desired goal by going down another path.

With the System Usability Scale criteria, the developers subtracted 5 to the sum of odd numbers and 25 to the even questions. Afterward, the developers got the sum of the two and multiplied it by 2.5.

$$\text{SUS Score} = x + y * 2.5$$

*SUS Formula*

Scores below 50% indicate serious deficiency in usability and suggest the need for substantial improvement with 68% being the average, and 70% being considered as good. With the data from the survey, Pawnquest was able to manage to get a rating of 85%, which is considered good, suggesting a decent level of usability (Bhat, 2023).

### IV.I.II Heuristics Evaluation

Pawnquest was evaluated qualitatively through Jakob Nielsen's 10 general principles for interaction design (Nielsen, 2024), below are what most of the users say:

*Visibility of System Status*

The prototype was able to inform the users of the outcome of their actions through easy-to-understand icons, making them informed of what were the processes within the prototype.

*Match Between System and Real World*

The prototype was easily understandable since it used basic English grammar that could be understood by people of all ages from our participants. The language and concepts were already familiar to the users.

*User Control and Freedom*

The prototype has a back button on almost all pages that enables users to go back whenever they misclick a specific icon or button, it also has a cancel option from some of the prompts within the system.

*Consistency and Standards*

The prototype had a consistent design from all views with the navigation bar being placed in the same place, the buttons, icons, and text also had consistent color palettes from varying views.

*Error Prevention*

There were some error preventions in place such as verification of details first before proceeding with a transaction, a prompt appearing if a user would like to log out, and following a procedure on the integrated online payment transaction before committing to an action.

*Recognition rather than recall*

The participants were satisfied as the pawnshop information such as number and location were already viewed before they could message them coming from the dashboard and object appraisal.

*Flexibility and Efficiency of Use*

The menu buttons on the sidebar navigation allowed quick access to significant app features making the participants satisfied.

*Aesthetic and Minimalist Design*

The prototype was an appealing design that captured the eyes of the users as it was fit for the user's standard of “aesthetic”. It also revolved around a small number of colors with green being the major one and revolved around it.

*Help Users Recognize, Diagnose, and Recover from Errors*

From the prototype in account registration, when a user is prompted to verify their account with a contact number or email, there exists a “next” button below even though you should only click the email and mobile number in the middle which confused users as it also didn’t have an error prevention when they clicked the next button directly.

*Help and Documentation*

The prototype had a Frequently Asked Questions page that answers some of the common questions that may arise when users use the prototype.

### IV.I.III Participant Survey and Feedback

| Section 1 | | | |
|---|---|---|---|
| Question | Mean | Interpretation | Classification |
| On a scale of 1 to 5, how would you rate your experience with | 4.80 | Highly Acceptable | Successful |

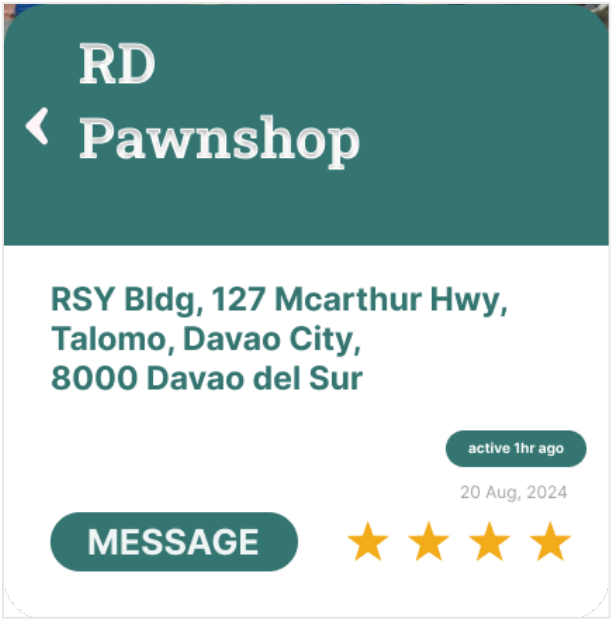
| | | | |
|---|---|---|---|
| the Pawnquest prototype? | | | |
| On a scale of 1 to 5, how was the UI design of the prototype? | 4.90 | Highly Acceptable | Successful |
| How easily were you able to follow the tasks provided? | 4.40 | Acceptable | Successful |
| Section 2 | | | |
| **Interface Design** | **Mean** | **Interpretation** | **Classification** |
| Account Registration | 5.00 | Highly Acceptable | Successful |
| Account log-in | 4.90 | Highly Acceptable | Successful |
| Editing of account details | 4.70 | Highly Acceptable | Successful |
| Object appraisal | 4.50 | Acceptable | Successful |
| Pawnshop Listing | 4.30 | Acceptable | Successful |
| Pawnshop navigation | 4.20 | Acceptable | Successful |
| Pawnshop Messaging | 4.40 | Acceptable | Successful |
| Section 3 | | | |
| **Task** | **Mean** | **Interpretation** | **Classification** |
| Account registration and details task | 4.90 | Highly Acceptable | Successful |
| Menu and dashboard task | 4.70 | Highly Acceptable | Successful |
| Appraisal and Messaging task | 4.50 | Highly Acceptable | Successful |
| **Average** | 4.63 | **Highly Acceptable** | **Successful** |

*Table 2: Survey Data Interpretation*

Table 2 presents the gathered data of the Pawnquest prototype after online and physical testing. The results have shown that the prototype is highly acceptable and is considered successful. The developers noticed that users were highly interested in the application due to its uniqueness and realization of ease of use.

## IV.II Design Implications

Although most of the feedback was positive, some of it was keen on some issues within the app. This includes pawnshop navigation, as some users were hesitant to buy from a pawnshop due to lack of credibility, although star ratings were present, others still found it lacking.

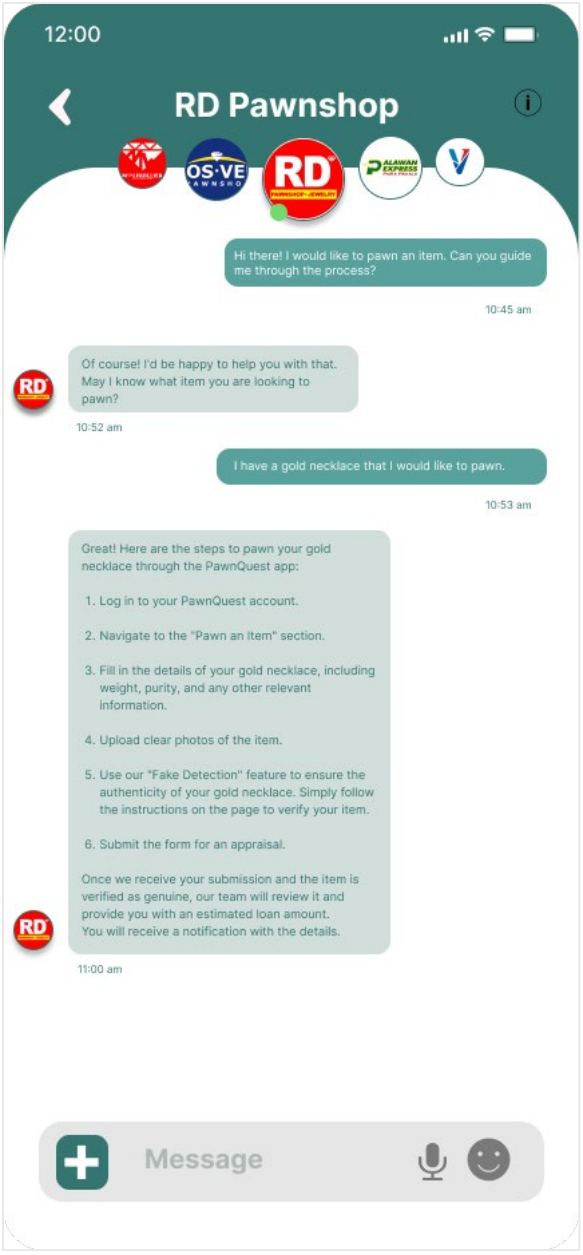



*Before alteration*

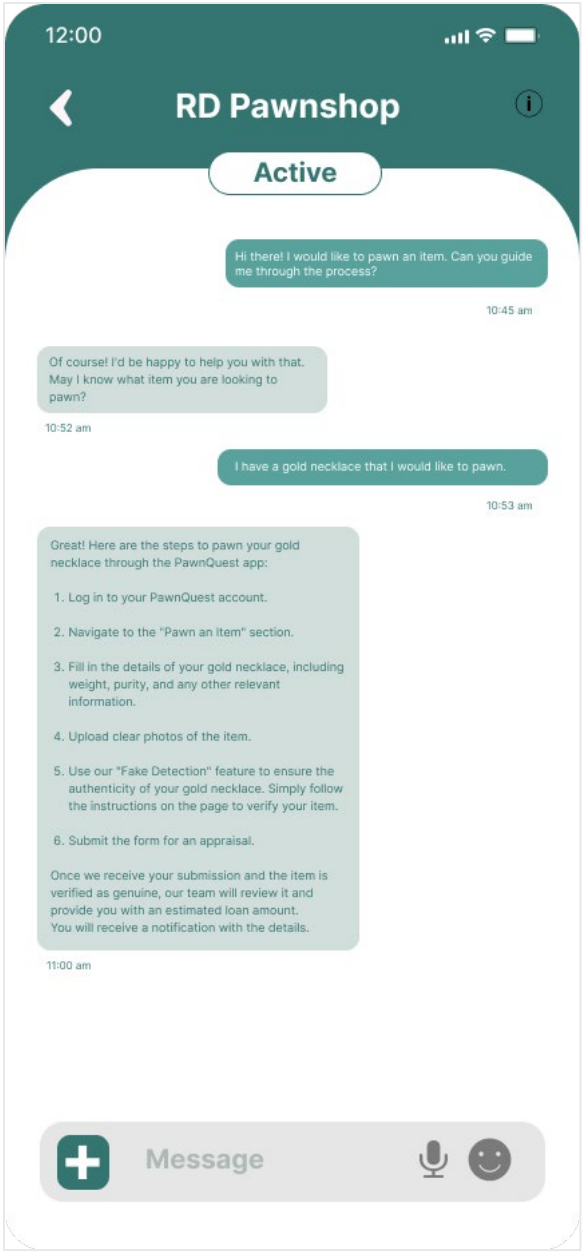

*After alteration*

Pawnshop navigation would greatly affect the profitability of Pawnquest as it boosts users' willingness to buy. Displaying the total number of transactions a pawnshop has completed, along with contact information such as phone numbers and emails, increases users' trust in the pawnshop, making them more likely to make a purchase.

Another design that has been criticized by users is the messaging feature, as the icons from the previous design seem to close to another confusing other users.




*Before alteration*




*After alteration*

Pawnshop messaging is where deals are being made and closed, thus, the developers had listed to the advice of its participants to redesign and declutter the repetitive images of a pawnshop's logo in the left and list of pawnshops logo to be messaged on top.

## IV. Critique and Summary

## Evaluation Advantages

The advantage the developers had was their way of handling the evaluation, they approached participants online and physically to cater to more people. This was done from school or their respective desk at their house, subsequently, through physical interviews, the developers were able to let the participants borrow their laptops to experience the prototype fully. The developers used Google Forms to collect and analyze data from physical and online participants as this platform helps streamline data collection and analysis.

## Evaluation Disadvantages

The disadvantage the developers had was that the internet connection was unstable for some users leading to a slow loading of assets in Figma, it also didn't fully immerse the users as the textbox wasn't fillable, and the contents within it was already predetermined making it a less immense experience for the participants, and lastly, some devices of the participants taking the evaluation had a smaller screen size leading to bugged features of the prototype. Given more time, the developers would like to have collected more data or reach a larger survey population to further identify specific functionality within the app that needs more improvement

## Conclusion

The developers had concluded that the development of Pawnquest was a success with positive feedback and decent evaluation scores from the participants. The concerns the participants had were well received by the developers with them updating it to a different design to further emphasize details of a pawnshop and provide future users with a clean and minimalistic messaging view. Evaluation tasks were easily accomplished by participants without developer assistance, thanks to intuitively designed buttons guiding users through their next actions.

Pawnquest has a huge potential to aid Filipinos in pawning wisely, due to its simple and easy-to-use interface. It includes a wide range of features such as item appraisal through 3D capture, fake detection, pawnshop navigation, messaging and video calls, personalization options, and enhanced security measures that ensure a streamlined and secure pawning experience. The app not only facilitates seamless

transactions but also builds user trust through transparency and authentication, promising a significant impact on the pawning industry in the Philippines.

## V. References


Statista. (n.d.). *Jewelry - Philippines | Statista market forecast*. https://www.statista.com/outlook/cmo/accessories/watches-jewelry/jewelry/philippines

Borres, I. L. (2020). Industry Analysis of Pawnshop in the Philippines. *International Journal of Business and Administrative Studies*, *6*(2). https://doi.org/10.20469/ijbas.6.10005-2

Bhat, A. (2023, August 14). *System Usability Scale: What it is, Calculation + Usage*. QuestionPro. https://www.questionpro.com/blog/system-usability-scale/

Nielsen, J. (2024, February 20). 10 Usability heuristics for user interface design. Nielsen Norman Group. https://www.nngroup.com/articles/ten-usability-heuristics/