Participant Form

Evaluation Of the Eco-Watch Gamified Energy-Saving Prototype
Course: Advanced Human-Computer Interaction (F21AD/F20AD)
Study Conductor: Syed Arif Ali
Institution: Heriot Watt University

You are Invited to Participate in A User Evaluation Study for The **Eco-Watch Gamified Energy-Saving Prototype**. This Study Aims to Assess the Usability, Engagement, And Interaction Effectiveness of The Prototype. Your Participation Is Voluntary, And You May Withdraw at Any Time Without Penalty.

This Study Is Conducted as Part of An Academic Project to Understand How Users Interact with The **Eco-Watch** App, Focusing on **Multimodal Interactions (Gesture, Voice, Touch)** And **Gamification Features**. Your Feedback Will Help Improve the Design.

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What Will I Be Asked to Do?
If You Agree to Participate, You Will Be Asked To:
1. Use The Eco-Watch Prototype and Complete a Series of Tasks (E.G., Navigating the Dashboard, Completing an Energy-Saving Challenge).
2. Provide Feedback Through a Think-Aloud Protocol, Interviews, And Surveys.
3. Allow Recording of Observations (E.G., Time Taken to Complete Tasks, Usability Challenges).
4. The Session Will Take Approximately 30-40 Minutes.

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Voluntary Participation & Withdrawal
• Your Participation Is Entirely Voluntary.
• You May Withdraw at Any Time Without Giving a Reason.
• If You Choose to Withdraw, Your Data Will Be Deleted Immediately.

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Confidentiality & Data Protection
• Your Responses Will Be Kept Confidential and Used Only for Academic Purposes.
• No Personally Identifiable Information Will Be Published.
• Data Will Be Anonymized and Securely Stored.

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Potential Risks & Benefits
• Risks: There Are No Known Risks Associated with Participation.
• Benefits: Your Feedback Will Contribute to Improving the Usability of Energy-Saving Applications.

Consent Declaration
Please Read the Following Statements Carefully and Check Each Box If You Agree:

☐ I have read and understood the information provided in this consent form.

☐ I voluntarily agree to participate in this study.

☐ I understand that my participation is confidential and my data will be anonymized.

☐ I understand that I can withdraw at any time without any consequences.

☐ I consent to my responses being recorded and used for research purposes.

Participant ID

User Feedback Interview (Demographic Data)
This Interview/Survey Section Collects Demographic Data from Users After Interacting with The Eco-Watch Gamified Energy-Saving Prototype to Identify User Age Sentiment and Experience.

Age Group:

☐ **10-18**

☐ **19-30**

☐ **31-50**

☐ **51+**

Familiarity With Energy-Saving Apps:

☐ **Very Familiar**

☐ **Somewhat Familiar**

☐ **Not Familiar**

Feedback Interview on Usability, Multimodal Interaction, Engagement & Gamification
Open-Ended Questions (Qualitative)
(Users Rate Each Statement on A Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree)

The Interface Was Easy to Navigate. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
The Gesture-Based Interaction (e.g., Waving to Turn Off the Light) Was Intuitive. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
The Voice Commands Worked Accurately and Consistently. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
The Touch Interface Was Easy to Use and Responsive. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Switching Between Different Interaction Modes (Voice, Gesture, Touch) Was Smooth and Seamless. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
The "Zaps" Reward System Made Saving Energy Feel More Engaging. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Competing In Energy-Saving Challenges Motivated Me to Interact More with The App. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
The App Provided Useful Feedback About My Energy-Saving Behaviour. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Would Recommend This App to My Family and Friends. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
What Did You Like the Most About the App?
What Features or Interactions Did You Find Confusing or Difficult to Use?
How Could the App's Multimodal Interactions (Voice, Gesture, Touch) Be Improved?
Did The Game-Based Rewards (Zaps, Leaderboards) Encourage You to Save Energy? Why Or Why Not?
Any Additional Suggestions for Improving the App?

System Usability Scale (SUS) Questionnaire
This Survey Section Collects a Standardized 10-Question Usability Survey That Is Used to Measure the Perceived Usability of The Eco-Watch Prototype.
Instructions: Please Indicate Your Level of Agreement with The Following Statements. (1 = Strongly Disagree, 5 = Strongly Agree)
SUS Question Rating Scale (1 = Strongly Disagree, 5 = Strongly Agree)

I Think That I Would Like to Use This System Frequently. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Found the System Unnecessarily Complex. (Reverse Scored) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Thought the System Was Easy to Use. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Think That I Would Need the Support of a Technical Person to Use This System. (Reverse Scored) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Found the Various Functions in This System Were Well Integrated. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Thought There Was Too Much Inconsistency in This System. (Reverse Scored) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Would Imagine That Most People Would Learn to Use This System Very Quickly. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Found the System Very Cumbersome to Use. (Reverse Scored) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Felt Very Confident Using the System. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
I Needed to Learn a Lot of Things Before I Could Get Going with This System. (Reverse Scored) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Thank You for Participating!

Dear Participant,

Thank You for Taking the Time to Participate in Our Evaluation Study for The Eco-Watch Gamified Energy-Saving Prototype. Your Valuable Insights and Feedback Will Help Us Improve the Usability, Engagement, And Effectiveness of Our System.

Your Participation Contributes to Advancements in Human-Computer Interaction (HCI) Research, Particularly in Designing Gamified and Multimodal Interaction Experiences for Energy-Saving Applications.

If You Have Any Further Thoughts or Suggestions, Feel Free to Reach Out. Your Input Is Greatly Appreciated!

Next Steps:

- **Your Feedback Will Be Analysed and Used to Enhance the Prototype.**
- **If You Wish to Receive a Summary of The Study's Findings, Please Let Us Know.**
- **Your Contributions Make a Difference—Thank You Once Again!**

Best Regards,

Syed Arif Ali

Heriot Watt University

Sa4001@Hw.Ac.Uk

Consent Declaration , Participant ID and Feedback Interview on Usability, Multimodal Interaction, Engagement & Gamification

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Timestamp	25/03/2025 12:37:02 AM	25/03/2025 05:49:58 PM	25/03/2025 10:44:06 PM	26/03/2025 10:54:26 AM	26/03/2025 03:28:16 PM
Consent Declaration	YES	YES	YES	YES	YES
Participant ID	H00463082	H00473375	H00502683	H00504162	H00457771
Age Group of Participant	31-50	31-50	19-30	19-30	31-50
Familiarity with energy-saving apps	Very Familiar	Not Familiar	Somewhat Familiar	Very Familiar	Not Familiar
The interface was easy to navigate.	5	5	4	5	4
The gesture-based interaction (e.g., waving to turn off the light) was intuitive.	4	4	3	5	5
The touch interface was easy to use and responsive.	5	4	5	4	4
Switching between different interaction modes (voice, gesture, touch) was smooth and seamless.	3	4	3	4	4
The "zaps" reward system made saving energy feel more engaging.	4	4	4	5	4
The app provided useful feedback about my energy-saving behaviour.	5	4	4	4	5
I would recommend this app to my family and friends.	5	4	4	5	4

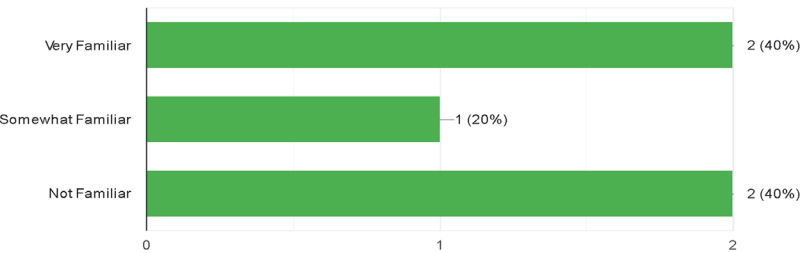**Feedback Interview on Usability, Multimodal Interaction, Engagement & Gamification**

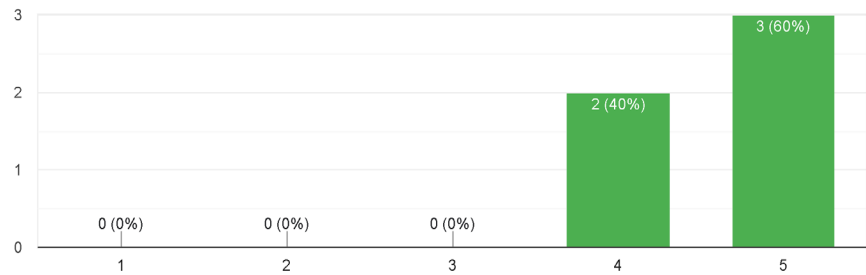| Open ended qualitative questions	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
What did you like the most about the app?	Difference in engagement based on age group. Really well thought process	The overall idea of the app	I get to know the daily usage and how much power each device use	The interactive features like zaps	Dashboard has a comprehensive data and is very well structured
What features or interactions did you find confusing or difficult to use?	I don't think there was any part where the feature or interaction which was difficult to use	Nothing as such	There was no back button you must navigate through below banner	I did not find anything confusing in the app.	Tab menu, the icon for devices could be easily mis-interpreted as homepage
How could the app's multimodal interactions (voice, gesture, touch) be improved?	The features to be more explicitly marked to identify the same but to the validation of the app there doesn't seem to be any major gap.	It could have more features	Rather than clicking on each voice button there should be a voice button on the top or bottom so it can be used for throughout the app	It could be improved by performing more tasks related to the app when you are away from home, like putting all devices in sleep mode.	The voice interaction, says "to begin click button" but did not mention what is the button label
Did the game-based rewards (zaps, leader boards) encourage you to save energy? Why or why not?	Yes, it will help users to be encouraged to use the app. It's helpful to take this up further.	Yes I liked the zaps idea a lot	For the kids it's fun, engaging and interactive	Did not really like it as an adult. It would be engaging for kids for sure.	I find leader board rather encouraging to save energy
Any additional suggestions for improving the app?	Colour scheme is tagged to the eco mode. The forward backward navigation can be further improved.	No	Text little bit bigger	I suggest adding a back button to navigate back to the home page easily.	To recommend the app to a friend in manage account section was a bit odd!

Feedback Graphs and Statistics
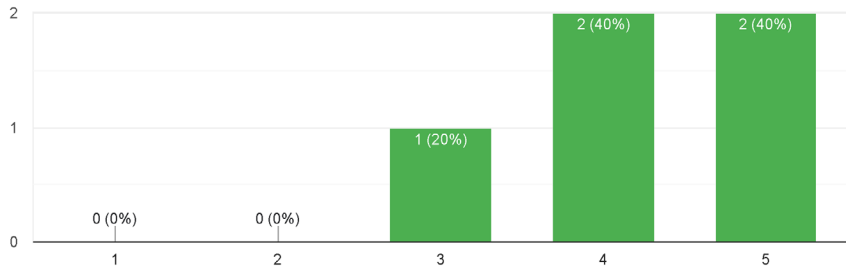
Age Group of Participant
5 responses

- 5-18
- 19-30
- 31-50
- 51+

60%

40%
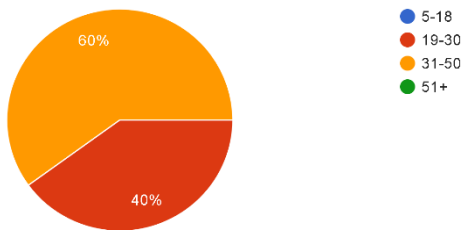
Familiarity with Energy-Saving Apps
5 responses

Very Familiar	2 (40%)
Somewhat Familiar	1 (20%)
Not Familiar	2 (40%)

The interface was easy to navigate.
5 responses

1	2	3	4	5
0 (0%)	0 (0%)	0 (0%)	2 (40%)	3 (60%)

The gesture-based interaction (e.g., waving to turn off the light) was intuitive.
5 responses

1	2	3	4	5
0 (0%)	0 (0%)	1 (20%)	2 (40%)	2 (40%)

The touch interface was easy to use and responsive.
5 responses
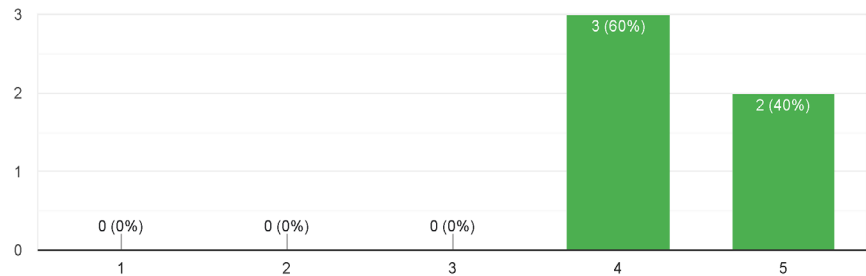
1	2	3	4	5
0 (0%)	0 (0%)	0 (0%)	3 (60%)	2 (40%)

Switching between different interaction modes (voice, gesture, touch) was smooth and seamless.
5 responses

1	2	3	4	5
0 (0%)	0 (0%)	2 (40%)	3 (60%)	0 (0%)
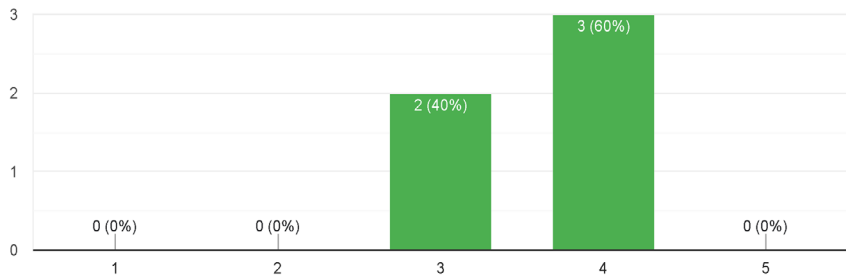
Feedback Graphs and Statistics

The "Zaps" reward system made saving energy feel more engaging.
5 responses

Score	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	4 (80%)
5	1 (20%)

The app provided useful feedback about my energy-saving behaviour.
5 responses

Score	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	3 (60%)
5	2 (40%)
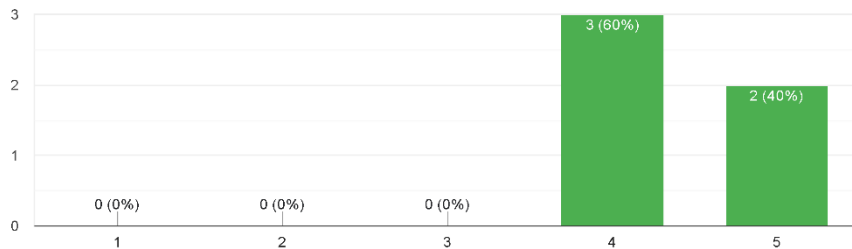
I would recommend this app to my family and friends.
5 responses

Score	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	3 (60%)
5	2 (40%)
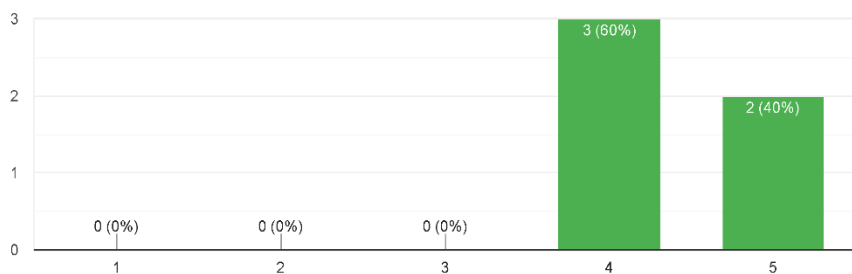
Median Scores of Perceptions of use of the Energy Saver App

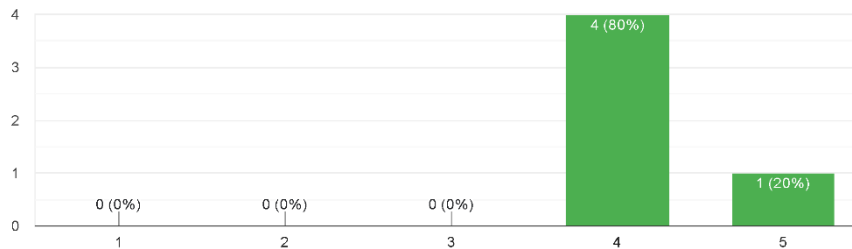| Statement	Median Score
I would recommend this app to my family and friends.	4
The app provided useful feedback about my energy-saving behaviour.	4
The "Zaps" reward system made saving energy feel more engaging.	4
Switching between different interaction modes (voice, gesture, touch) was smooth and seamless.	4
The gesture-based interaction (e.g., waving to turn off the light) was intuitive.	4
The touch interface was easy to use and responsive.	4
The interface was easy to navigate.	5

Median Scores on a Scale of 1-5

Median Scores: Attitude Toward Use of Energy Saver App

Statement	Median Score
I needed to learn a lot of things before I could get going with this system.	2
I found the system very cumbersome to use.	2
I thought there was too much inconsistency in this system.	1
I think that I would need the support of a technical person to use this system.	1
I found the system unnecessarily complex.	1
I felt very confident using the system.	5
I would imagine that most people would learn to use this system very quickly.	4
I found the various functions in this system were well integrated.	4
I thought the system was easy to use.	4
I think that I would like to use this system frequently	4

Median Score on a Scale of 1-5

**System Usability Scale (SUS) Questionnaire**

Questions	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
I think that I would like to use this system frequently	4	4	4	5	4
I found the system unnecessarily complex.	1	2	2	1	1
I thought the system was easy to use.	5	4	4	4	5
I think that I would need the support of a technical person to use this system.	1	2	2	1	1
I found the various functions in this system were well integrated.	5	4	4	4	4
I thought there was too much inconsistency in this system.	1	1	2	2	1
I would imagine that most people would learn to use this system very quickly.	5	4	4	5	4
I found the system very cumbersome to use.	3	2	3	2	1
I felt very confident using the system.	5	4	4	5	5
I needed to learn a lot of things before I could get going with this system.	2	1	2	2	1

SUS Graphs and Statistics

## I think that I would like to use this system frequently
5 responses

Value	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	4 (80%)
5	1 (20%)
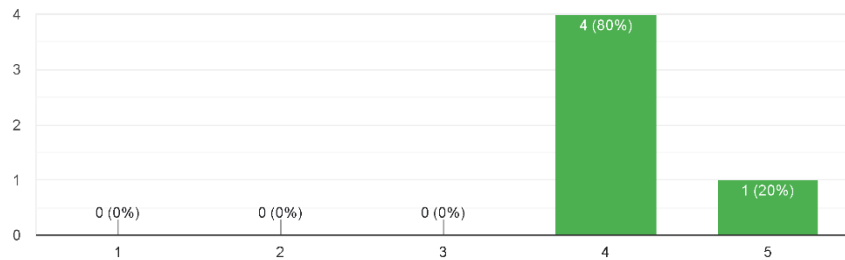
I found the system unnecessarily complex.
5 responses

Value	Count
1	3 (60%)
2	2 (40%)
3	0 (0%)
4	0 (0%)
5	0 (0%)
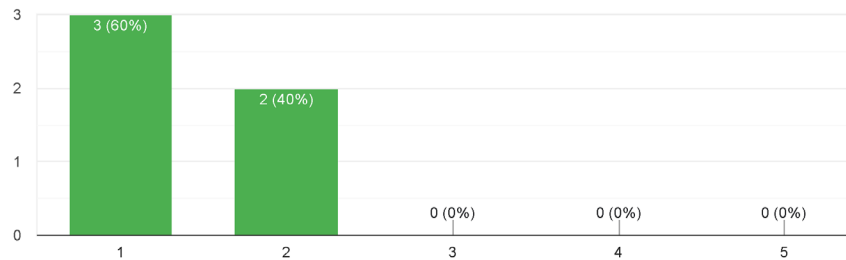
I thought the system was easy to use.
5 responses
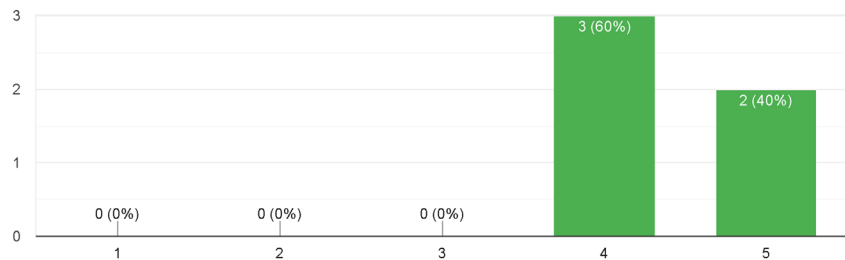
Value	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	3 (60%)
5	2 (40%)

I think that I would need the support of a technical person to use this system.
5 responses

Value	Count
1	3 (60%)
2	2 (40%)
3	0 (0%)
4	0 (0%)
5	0 (0%)
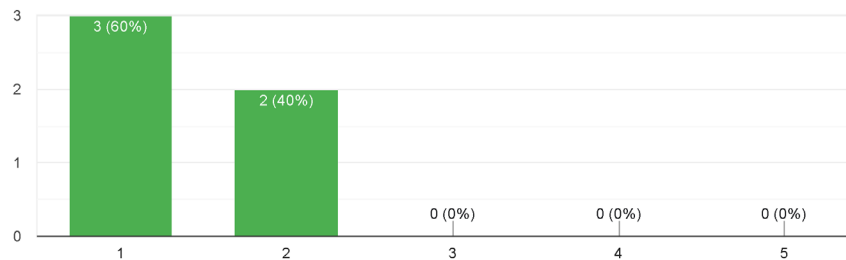
I found the various functions in this system were well integrated.
5 responses
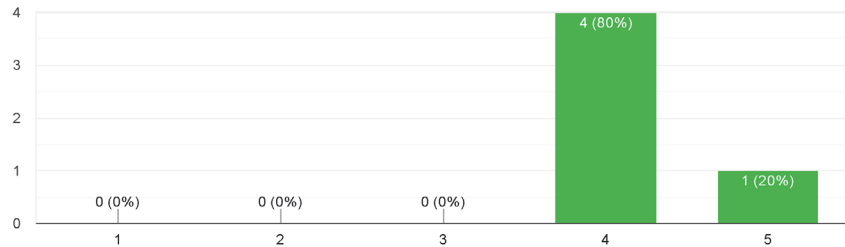
Value	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	4 (80%)
5	1 (20%)

I thought there was too much inconsistency in this system.
5 responses

Value	Count
1	3 (60%)
2	2 (40%)
3	0 (0%)
4	0 (0%)
5	0 (0%)
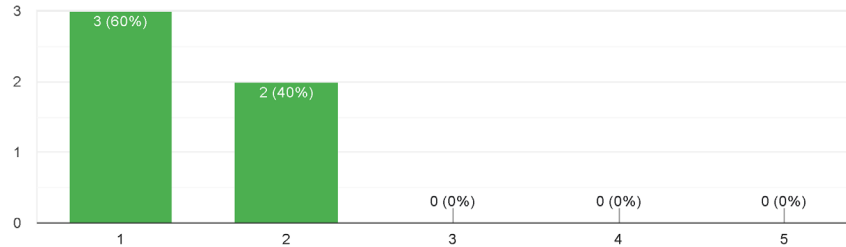
SUS Graphs and Statistics

I would imagine that most people would learn to use this system very quickly.
5 responses

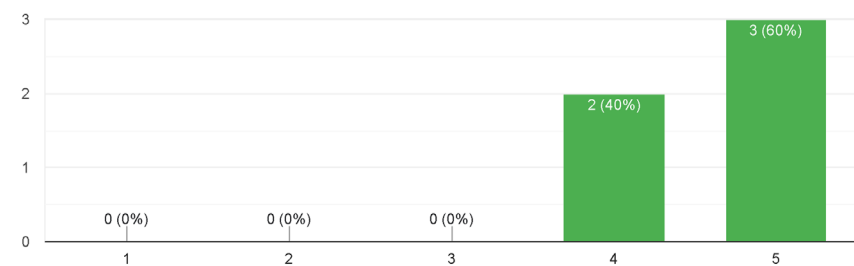| Rating	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	3 (60%)
5	2 (40%)
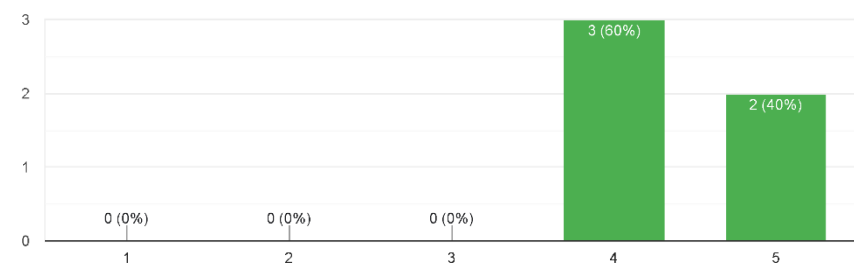
I found the system very cumbersome to use.
5 responses

Rating	Count
1	1 (20%)
2	2 (40%)
3	2 (40%)
4	0 (0%)
5	0 (0%)
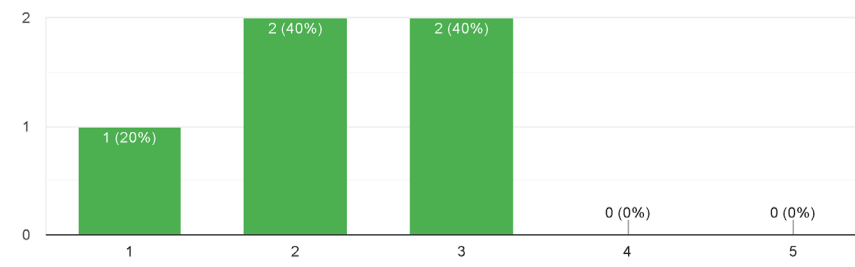
I felt very confident using the system.
5 responses

Rating	Count
1	0 (0%)
2	0 (0%)
3	0 (0%)
4	2 (40%)
5	3 (60%)

I needed to learn a lot of things before I could get going with this system.
5 responses

Rating	Count
1	2 (40%)
2	3 (60%)
3	0 (0%)
4	0 (0%)
5	0 (0%)