SafeZone App Usability Experiment
AE2 – HCI
Fri- Group 3 – 10am

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Product Description

SafeZone is a mobile application designed to enhance student safety and support university attendance monitoring. It allows students to check in on campus and provides instant access to emergency assistance. The app primarily functions as an emergency response system, enabling immediate contact with campus security. When the emergency button is activated, security personnel follow up to confirm the user's safety.

Additionally, SafeZone has recently incorporated an attendance tracking feature for student visa holders, requiring them to check in at the start of each class to ensure compliance with university policies. Attendance records are securely stored for engagement monitoring and academic support.

Evaluation Goal

The goal of this research is to understand user perceptions of the SafeZone app and identify common misconceptions, particularly regarding the Check-in Timer and Emergency functions. This study builds upon previous heuristic analysis findings (see Figure 3), which highlighted specific misconceptions among evaluators. Understanding these perceptions is crucial for informing design improvements and enhancing the overall user experience, ensuring that all users, especially those on student visas, can navigate the app effectively. The primary research questions guiding this study are:

1. **What common misconceptions do users have regarding the Check-in and Emergency functions based on previous heuristic analysis findings?**
2. **Do users correctly understand the purpose of the Check-in Timer function?**
3. **Are users aware of other key functions within the SafeZone app?**

These issues are critical, particularly for student visa holders who must accurately log attendance. Misunderstanding the Check-in Timer may result in unnecessary emergency alerts or missing required check-ins, while confusion about emergency assistance could delay help in urgent situations. This study aims to uncover these gaps and provide recommendations to

enhance usability, ensuring SafeZone is both intuitive and effective.

Evaluation Plan

Evaluation Method

This observational study aims to gather insights into user interactions with the SafeZone app. Participants will complete tasks and provide feedback based on their experiences, allowing us to identify common misconceptions and usability issues. Data will be collected through structured questionnaires and user feedback, focusing on perceptions rather than success rates alone.

Participants

- Sample Size: 5 university students.
- User Groups: All participants are regular users of the SafeZone app, facilitating a focused analysis of usability and perceptions

Independent Variable

This study does not include an independent variable because all participants are experienced users of the SafeZone app, eliminating variation in user familiarity. Instead, the focus is on observing user interactions and perceptions of specific app functions, such as the Check-in Timer and Emergency Assistance.

Dependent Variables

- Task Engagement: Observed interactions with key features (e.g., check-in, check-out, raising and canceling alarms).
- Misconception Identification: Noted instances of misconceptions regarding SafeZone functions.
- Clarity Feedback: User-reported clarity of features, rated on a scale of 1 to 5.

Control Variables

- All participants will use the same version of the SafeZone app.
- The tasks will be performed in an environment where all functions of the SafeZone are functioning normally.

Briefing (Participant Instructions)

Participants will be informed that this is a usability evaluation of the SafeZone app conducted through a Microsoft Form. They will complete the following tasks while interacting with the app:

- Check-in and Check-out within a SafeZone-valid location.
- Check-in Timer Interaction to provide their understanding of its functionality.
- Emergency Alert Simulation by canceling an accidental alert activation.

Participants are encouraged to share their thoughts and any challenges they encounter, which will be recorded for further insights.

Task Execution

Participants will perform these tasks independently using the SafeZone app.

Any difficulties or confusion encountered will be assessed based on their questionnaire responses.

Data Collection

After completing the tasks, participants will answer a structured questionnaire to evaluate their understanding and user experience.

The questionnaire includes:

- Questions assessing knowledge of SafeZone features.
- Rating scales to gauge function clarity.
- Open-ended feedback on areas for improvement.

Debriefing

Participants will be thanked for their participation.

They will have the opportunity to share additional feedback on usability issues.

Expected Outcomes

- Identify common misconceptions about the Check-in Timer, ensuring users fully understand its function and purpose.
- Evaluate overall user awareness of SafeZone's key safety features, including Check-in, Check-in Timer, and Emergency Assistance.
- Assess whether SafeZone's functions are clearly communicated or if improvements are needed to enhance user comprehension.
- Provide recommendations to improve usability and user understanding, based on participant feedback, to enhance SafeZone's effectiveness in safety and attendance tracking.

Pilot Summary

During the pilot, we discovered that while participants generally understood the Check-in and Emergency Assistance functions, there was significant confusion surrounding the Check-in Timer feature (see Figure 3). Participants misunderstood its purpose, with some believing it allowed automatic check-ins, while others thought it tracked location in real time. This inconsistency suggested that participants in the main study might misinterpret this feature, potentially leading to inaccurate feedback regarding its usability and purpose.

Based on these findings, we allowed participants to explore the SafeZone app before task execution, ensuring the Check-in Timer was known to them. Additionally, we modified the questionnaire to include more targeted questions addressing users' understanding of this function. These adjustments were made to align participant understanding with the evaluation objectives and to ensure that the data collected during the main study would be both accurate and meaningful.

Experiment Results

User Recognition of SafeZone Functions

Participants were asked to recall which functions they remembered from the SafeZone app. According to the responses collected:

- 60% of participants remembered the Check-in function
- 40% recalled the Emergency Assistance feature
- No participants specifically mentioned the Check-in Timer

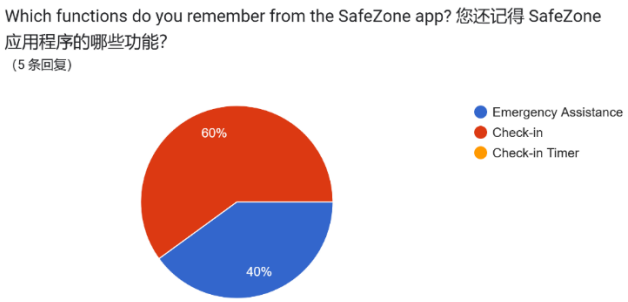

Figure 1. Most noticeable function according to the Participants Responses

This suggested that the check-in timer is not a widely recognized feature. There is a potential gap in user awareness and functional understanding.

Misconceptions About the Check-in Timer

Participants were asked what they thought the Check-in Timer does. The results highlight significant confusion (see Figure 6):

- 20% believed it allows automatic check-in
- 80% thought it tracks locations in real-time
- No participants thought it would send an alert after the time ends

The result confirmed that most users do not understand the actual function of the Check-in Timer. Misunderstanding of this feature may result in missed alarms or accidental alarm activation in emergency situations, causing confusion for students and university security personnel.

Frequency of Check-in Feature Usage

Participants were asked how often they use the Check-in feature:

- 40% use it daily
- 60% use it weekly
- No participants reported monthly or rare usage

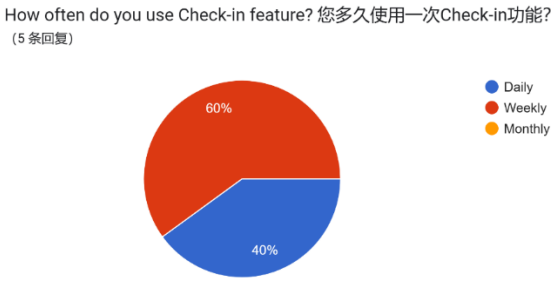

Figure 2. Check-In feature usage

This indicated that students do engage with the Check-in function regularly. It reinforces the importance of ensuring they fully understand what the functions' objectives are.

Awareness of Emergency Assistance Location

All participants used the Emergency Button on the homepage to request emergency assistance.

According to Figure 7 it is confirmed that there was no misunderstanding of the emergency button. The Check-in Timer function was not used.

Clarity of SafeZone's Functions

Participants rated the clarity of SafeZone's functions on a scale from 1 to 5 (1 = Very unclear, 5 = Very clear), see Figure 8:

- 60% rated it as 4 (fairly clear)
- 20% rated it as 3 (moderately clear)
- 20% rated it as 2 (unclear)

Although most users thought the app was clear enough, 20% still found it difficult to understand. Combined with the above issues about the Check-in Timer, there is room for improvement in SafeZone's function explanation and interface design.

Improvements

Participants provided open-ended feedback on how to improve SafeZone usability. The key suggestions included (see Figure 4):

- The emergency button is too big, making accidental activation more likely.
- Adding a check-in history or confirmation message to inform users if check-in was successful.
- Clearer distinction between the First Aid and Emergency buttons, as they appear to have similar functions.
- Allow users to set safe zones and dangerous areas, triggering alerts when entering or leaving predefined locations.

Discussion

Our assessment indicates that users have a serious misunderstanding of the "Check-in Timer" feature, 80% of the participants wrongly believed that it could track location in real time, while 20% thought it could automatically check in. Such misunderstandings may lead to missed check-ins or unnecessary emergency alerts. In addition, 40 percent of participants used the check-in feature daily and 60 percent used it weekly, but none could accurately recall the "check-in timer," suggesting that users knew little about the feature.

The evaluation of SafeZone has yielded insightful findings that relate directly to our research questions. One key observation is that while participants generally understood the core functions of SafeZone, misconceptions regarding the purpose and activation of the emergency button were prevalent. This indicates a need for clearer onboarding instructions or in-app guidance to ensure users fully grasp the intended usage of critical safety features. Additionally,

the timer function, intended for user safety, was frequently overlooked or misinterpreted, suggesting that its visibility and user prompts could be improved.

Key user-suggested improvements include:

- Reduce the size of the emergency button to prevent accidental triggering.
- Distinguish between first aid and emergency assistance to avoid confusion.
- Adding a check-in history or confirmation message to inform users of successful check-ins.

Overall, SafeZone needs to optimize the UI design and functional descriptions to improve user awareness of the Check-in Timer and ensure that students can use the app correctly.

Reflective summary

The experiment was successfully conducted but highlighted some challenges. The pilot study revealed that participants were unfamiliar with the Check-in Timer, so we adjusted the experiment by allowing them to explore the app beforehand, improving test accuracy.

For data collection, structured questionnaires worked well, but open-ended responses were limited. Future studies could incorporate follow-up interviews for richer insights. Additionally, some participants struggled with the Check-in Timer task, suggesting that a brief tutorial before the experiment could improve clarity.

Team collaboration helped streamline the process, but time constraints were a challenge, requiring better scheduling in future studies. Overall, this evaluation provided practical recommendations for improving SafeZone, while also deepening our understanding of HCI experiment design.

Appendix

Heuristic Principle	Issues	Severity (10 = Best)	Recommendations
1. Visibility of System Status	Notifications are unclear, no feedback after actions.	6/10	Improve notification visibility, and add animations/audio cues.
2. Match Between System and the Real World	"Check-in timer" label is misleading.	2/10	Rename to "Emergency Timer" with clear warnings.
3. User Control and Freedom	No "Exit" button; Cancel button replaces check-in; No language settings.	4/10	Add exit/cancel buttons, keep functions visible, and allow in-app language selection.
4. Consistency and Standards	"Enquiry" is not translated into Chinese version.	6/10	Ensure full UI localization with testing.
5. Error Prevention	Accidental emergency activation: Users forget check-out.	3/10	Add confirmation dialogs; Implement GPS-based auto check-out or reminders.
6. Recognition Rather than Recall	No search function; No check-in history; No class schedule link.	4/10	Add a search bar, check-in history, and calendar sync.
7. Flexibility and Efficiency of Use	No quick emergency access; Security features are hard to use.	4/10	Implement long-press gestures, pull-down menus, and clearer guidance.
8. Aesthetic and Minimalist Design	Poor onboarding; Flashlight function redundant; Lacks accessibility.	6/10	Add tutorials, remove redundant features, and improve accessibility options.
9. Help Users Recognize, Diagnose, and Recover from Errors	No clear check-in feedback.	8/10	Add pop-ups, sound cues, and a check-in log.
10. Help and Documentation	Android compatibility issues; Excessive permission requests.	4/10	Optimize permissions, add troubleshooting guides, and improve FAQs.

Figure 3. Evaluation Chart – Heuristic Analysis: Safe Zone App

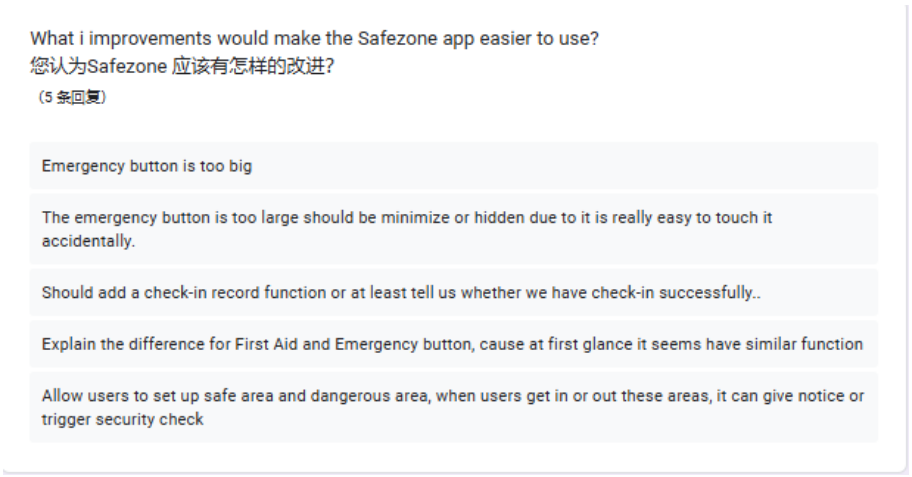

Figure 4. Participants' improvement suggestions

Which functions do you remember from the SafeZone app?	What do you think the Check-in Timer function does?	How often do you use the Check-in feature?	Where would you go in the app to request emergency assistance?	On a scale from 1 to 5, how clear are Safezone's functions (1=Very Unclear, 5=Very Clear)	What improvements would make the Safezone app easier to use?
Check-in	Tracks your location in real-time	Weekly	Emergency button	4	Allow users to set up safe area and dangerous areas, when users get in or out of these areas, it can give notice or trigger a security check.
Check-in	Tracks your location in real-time	Weekly	Emergency button	3	Explain the difference between the First Aid and Emergency buttons because, at first glance, they seem to have a similar function.
Check-in	Allows you to set a timer for automatic check-in	Daily	Emergency button	2	Should add a check-in record function or at least tell us whether we have checked in successfully?
Emergency Assistance	Tracks your location in real-time	Daily	Emergency button	4	The emergency button is too large and should be minimized or hidden due to it is easy to touch it accidentally.
Emergency Assistance	Tracks your location in real-time	Weekly	Emergency button	4	The emergency button is too big

Figure 5. Evaluators Responses

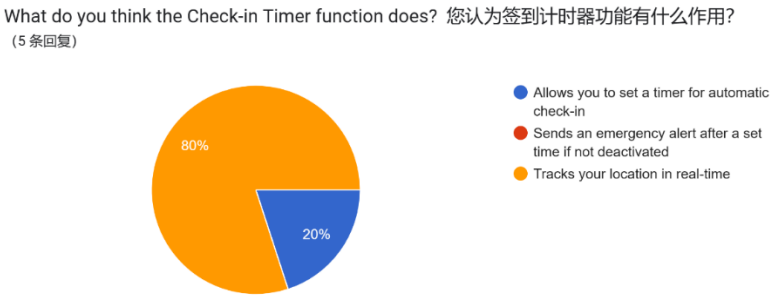

Figure 6. Partcipants Response regarding Check-In Timer

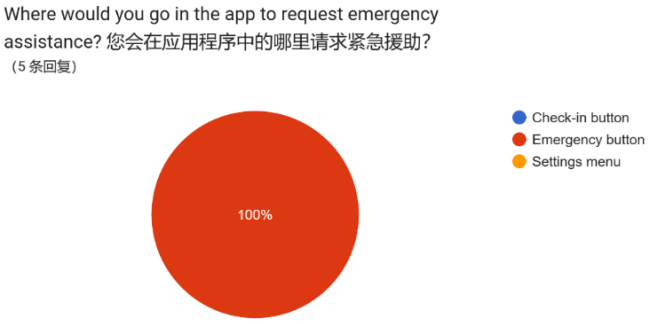

Figure 7. Participants Responses regarding Requesting Emergency Assistance

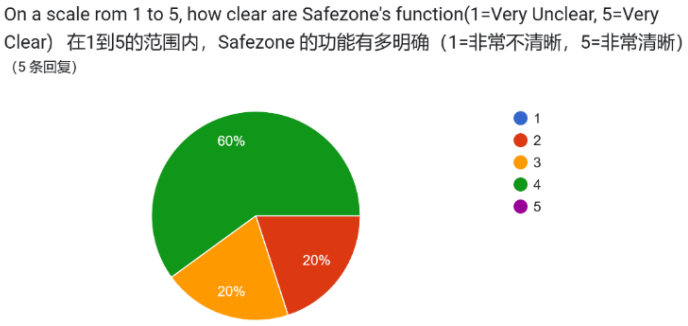

Figure 8. SafeZone Functions Meaning according to Participants Response

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Ethics checklist form for assessed exercises (at all levels)

This form is only applicable for assessed exercises that use other people ('participants') for the collection of information, typically in getting comments about a system or a system design, or getting information about how a system could be used, or evaluating a working system.

If no other people have been involved in the collection of information, then you do not need to complete this form.

If your evaluation does not comply with any one or more of the points below, please contact the Chair of the School of Computing Science Ethics Committee (matthew.chalmers@glasgow.ac.uk) for advice.

If your evaluation does comply with all the points below, please sign this form and submit it with your assessed work.

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1. Participants were not exposed to any risks greater than those encountered in their normal working life.
   Investigators have a responsibility to protect participants from physical and mental harm during the investigation. The risk of harm must be no greater than in ordinary life. Areas of potential risk that require ethical approval include, but are not limited to, investigations that occur outside usual laboratory areas, or that require participant mobility (e.g. walking, running, use of public transport), unusual or repetitive activity or movement, that use sensory deprivation (e.g. ear plugs or blindfolds), bright or flashing lights, loud or disorienting noises, smell, taste, vibration, or force feedback

2. The experimental materials were paper-based, or comprised software running on standard hardware.
   Participants should not be exposed to any risks associated with the use of non-standard equipment: anything other than pen-and-paper, standard PCs, laptops, iPads, mobile phones and common hand-held devices is considered non-standard.

3. All participants explicitly stated that they agreed to take part, and that their data could be used in the project.
   If the results of the evaluation are likely to be used beyond the term of the project (for example, the software is to be deployed, or the data is to be published), then signed consent is necessary. A separate consent form should be signed by each participant.

   Otherwise, verbal consent is sufficient, and should be explicitly requested in the introductory script.

4. No incentives were offered to the participants.
   The payment of participants must not be used to induce them to risk harm beyond that which they risk without payment in their normal lifestyle.

5. No information about the evaluation or materials was intentionally withheld from the participants.
   Withholding information or misleading participants is unacceptable if participants are likely to object or show unease when debriefed.

6. No participant was under the age of 16.
   Parental consent is required for participants under the age of 16.

7. No participant has an impairment that may limit their understanding or communication.
   Additional consent is required for participants with impairments.

8. Neither I nor my supervisor is in a position of authority or influence over any of the participants.
   A position of authority or influence over any participant must not be allowed to pressurise participants to take part in, or remain in, any experiment.

9. All participants were informed that they could withdraw at any time.
   All participants have the right to withdraw at any time during the investigation. They should be told this in the introductory script.

10. All participants have been informed of my contact details.
    All participants must be able to contact the investigator after the investigation. They should be given the details of both student and module co-ordinator or supervisor as part of the debriefing.

11. The evaluation was discussed with all the participants at the end of the session, and all participants had the opportunity to ask questions.
    The student must provide the participants with sufficient information in the debriefing to enable them to understand the nature of the investigation. In cases where remote participants may withdraw from the experiment early and it is not possible to debrief them, the fact that doing so will result in their not being debriefed should be mentioned in the introductory text.

12. All the data collected from the participants is stored in an anonymous form.
    All participant data (hard-copy and soft-copy) should be stored securely, and in anonymous form.

Course and Assessment Name __Human Computer Interaction Design and Evaluation, AE2 Experiment__

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Student's Signature Jiaxin cheng, Mingze Gao, Gloris Denisse Cedeno, Wencheng Shi , Yang Song, Yaohui Han

Date _____19/02/2025_____